

CONTINUATION OF THE  
BULLETIN OF THE NUTTALL ORNITHOLOGICAL CLUB

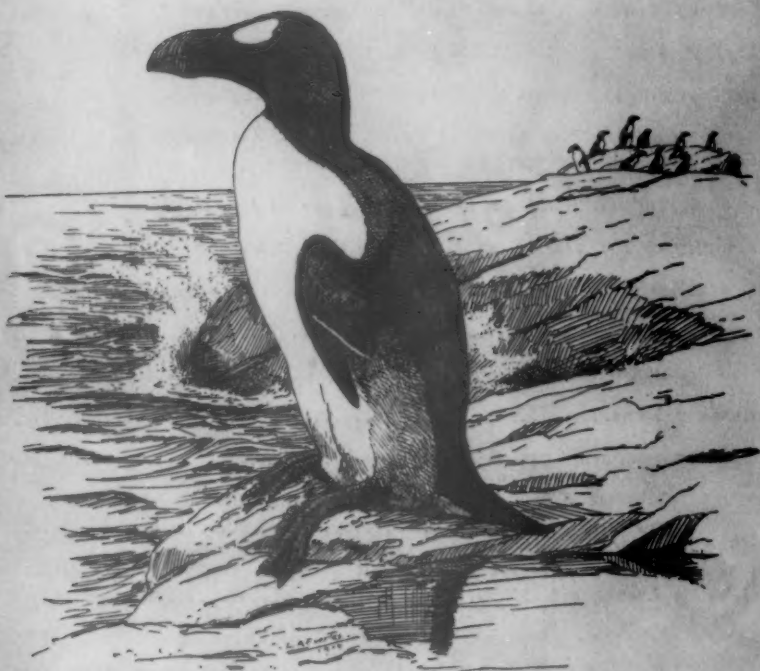
# The Auk

A Quarterly Journal of Ornithology

Vol. 58

JANUARY, 1941

No. 1



PUBLISHED BY

**The American Ornithologists' Union**

LANCASTER, PA.

Entered as second-class mail matter in the Post Office at Lancaster, Pa.

Accepted for mailing at special rate of postage provided for in the Act of October 3, 1917, embodied in paragraph 4, section 538, P. L. and R., authorized May 15, 1920.

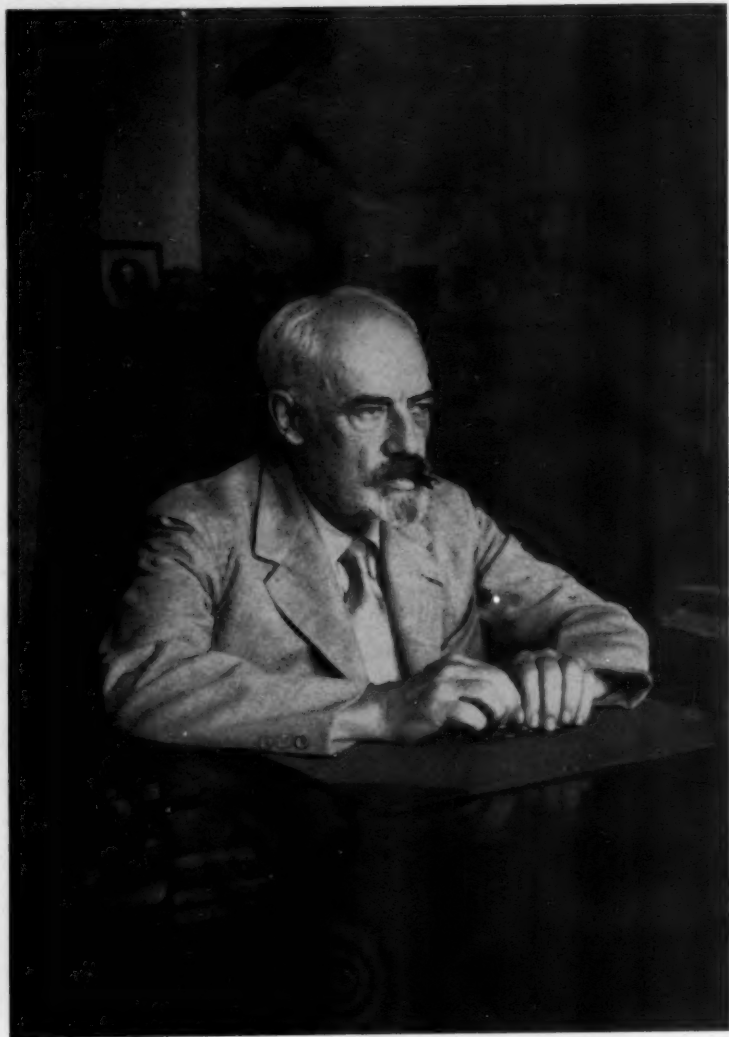
## CONTENTS

---

|  |     |
|--|-----|
| IN MEMORIAM: JAMES HENRY FLEMING. By <i>L. L. Snyder</i> . (Plate 1).....  | 1   |
| BREEDING BIOLOGY OF SILVERY-CHEEKED HORNBILL. By <i>R. E. Moreau, C.F.A.O.U.,</i><br>and <i>Winifred M. Moreau</i> .....               | 13  |
| NESTING OF THE GRAY FLYCATCHER. By <i>Henry N. Russell, Jr.,</i> and <i>Angus M.</i><br><i>Woodbury</i> .....                          | 25  |
| NOTES ON MACGILLIVRAY'S SEASIDE SPARROW. By <i>Ivan R. Tomkins</i> . (Plates 2, 3). ..   | 36  |
| FEEDING OF NESTLING BANK SWALLOWS. By <i>Dayton Stoner</i> and <i>Lillian C. Stoner</i> ..   | 52  |
| 'COURTSHIP FEEDING IN BIRDS.' By <i>David Lack</i> and others.....   | 56  |
| WING SKELETON AND FLIGHT OF HAWKS. By <i>William L. Engels</i> .....   | 61  |
| FROM COLORADO SPRINGS TO HORSE CREEK IN 1878. By <i>Charles E. H. Aiken</i> .<br>FOREWORD AND POSTSCRIPT by <i>E. R. Warren</i> :..... | 70  |
| TARSAL FEATHERING IN RUFFED GROUSE. By <i>Leonard J. Uttal</i> .....   | 74  |
| TAXONOMY OF PALAEARCTIC GOSHAWKS. By <i>N. A. Gladkov</i> .....  | 80  |
| GENERAL NOTES. (Plate 4).....  | 91  |
| RECENT LITERATURE.....   | 111 |
| CONSERVATION NOTES. By <i>Francis H. Allen</i> .....   | 130 |
| NOTES AND NEWS.....  | 131 |
| CORRESPONDENCE: Unidentified Bird Names.....   | 134 |
| OBITUARIES: Robert White Williams, Charles Bill, Charles Edward Ingalls,<br>Bruno Liljefors.....                                       | 135 |
| THE FIFTY-EIGHTH STATED MEETING OF THE AMERICAN ORNITHOLOGISTS' UNION.<br>By <i>Lawrence E. Hicks</i> .....                            | 138 |
| FINANCIAL REPORT OF THE TREASURER FOR THE YEAR ENDED SEPTEMBER 30, 1940.<br>By <i>Rudyard Boulton</i> .....                            | 148 |



1  
13  
28  
38  
52  
56  
61  
70  
74  
80  
91  
111  
130  
131  
134  
135  
138  
148



*Yours truly J. H. Fleming*

# THE AUK

## A QUARTERLY JOURNAL OF ORNITHOLOGY

---

VOL. 58

JANUARY, 1941

No. 1

---

### IN MEMORIAM: JAMES HENRY FLEMING

BY L. L. SNYDER

#### *Plate 1*

JAMES HENRY FLEMING died at his home in Toronto on June 27, 1940. An illness which became manifest during the previous winter had seemed to forebode the end. Although the shock was thus somewhat tempered for us near him, we all feel the untimeliness of his passing at the age of sixty-seven. Throughout his life, Mr. Fleming, though seldom ill, was never vigorously rugged. He was ever careful of his health and strength and it is my belief that we owe to this habit, the extension of so useful a life into its sixty-eighth year.

Those of us in the Toronto region have lost our dean, our adviser and good friend; but the passing of James Henry Fleming is not of mere local concern. He had intimates in far places and good friends and acquaintances the world over. He had travelled much and the personal contacts made were continued by assiduous correspondence. He will be missed for a long time throughout the ornithological world. Though the person now be gone, the personality will live on in the memories of his friends, in the manifold influences which he brought to bear on the rest of us, and in the well-organized harvest of his life work.

The name J. H. Fleming, as he always signed it, had come to mean far more than the appellation of an individual. It denoted an institution,—a personality plus ornithological archives. In this combination, each was infused with the other. The vast collection of scientific specimens, the extensive library and the store of ornithological miscellany were major features of his environment and most certainly shaped the life and thoughts of the man. On the other hand, the man virtually created much of his environment; he had chosen and assembled the things which surrounded him and imparted to

them much of his personality. Evidence of his manner and his thoughts are permanently inscribed on the countless labels, in the letters and notes, on the fly-leaf and margins of books, and in the very nature of his scientific treasure left with us.

In submitting a brief appreciation of the life and work of James Henry Fleming, certain matters of fact are included, which though coldly statistical, are essential. Fleming's father, James Fleming, came to Canada (Montreal) from Aberdeen, Scotland, in 1834, at the age of twenty-four. In 1836, he established a pioneer seed-growing business on a three-acre plot now marked by Yonge and Elm Streets, Toronto. After the death of his first wife, he married Mary Elizabeth Wade, daughter of a family of English descent living near Port Hope, Ontario. James Henry, the only child of this union who survived, was born at Toronto on July 5, 1872. There was a half-sister in the home, from his father's previous marriage, but no brothers. The father was a man sixty years of age when James Henry was born.

Such is the background of the man whom we knew to be social at heart but reserved among strangers and very capable of working contentedly alone.

James Henry Fleming's education was obtained in Toronto. As a child he attended the Model School in St. James Square, a school still maintained in conjunction with the adjacent teachers' training institution. Often I have listened to Fleming remark on the happenings of those days,—happenings which ranged from notable historical events to pranks of "the boys," and I am inclined to believe that in all these, the boy Fleming was an interested on-looker.

After passing through the grades of the Model School, Fleming entered Upper Canada College. This institution, not a part of the public school system, is patterned after the English schools. It and similar schools in Canada impart to their students something of the manner of the Old World; they contribute toward keeping Canadian culture an intergrade between the "English" and the "American." Undoubtedly Fleming's manner and viewpoint were kindred to both. Although Fleming's formal education ended with the secondary school his intellectual pursuits ceased only with his death. He read a great deal, not only in the field of ornithology, but in other affairs. He kept in touch with current political and business events, and as a matter of taste, read travel, historical and biographical works extensively.

It is not possible to account fully for the origin of Fleming's inter-

est in birds. His father, aside from being a business man and community leader (alderman, St. John's Ward, 1877-79 inclusive), was a scientific gardener and contributed to the literature on horticulture. This may account for James Henry's subsequent interest in plant culture—in his greenhouse and garden—but I am inclined to believe that the study of birds was a spontaneous and self-cultivated hobby of the boy which developed without particular influence of others and continued without interruption as the life work of the man.

We know that Fleming's interest in birds had become fixed when he was twelve years old. The nest and eggs of the Vesper Sparrow in his collection were collected and prepared by him in 1884. Also, there is a small lot of mounted native songbirds collected in the Elm Street gardens during his youth. The idea of building a study collection occurred to him in 1886, at the age of fourteen, according to Fleming's own recorded recollection.

On the authority of a boyhood friend, E. J. Deacon, Fleming was a serious and studious youth. Mr. Deacon tells me that he and "Harry" and other boys went together on bird-specimen hunts during their 'teens. It was not long before most of the boys' collections of purloined eggs and stuffed birds fell into disarray and final extinction but the Fleming collection kept on growing and growing. This collection was, from the first, not merely a local one; bird skins, numbers 1 and 2, are specimens of the King-of-the-Paradise-Birds, *Cincinnurus regius*, from New Guinea. Further, it is recorded in Fleming's register that a certain South American hummingbird specimen was bought by him when he was a boy attending Model School. Another entry records the fact that six other hummingbirds were purchased in 1884 or 1885 at a bankrupt millinery-stock sale on King Street opposite St. Andrew's Church. For these he paid ten cents each, the money having been saved out of his school-lunch allowance.

In March 1889, at the age of sixteen, Fleming had become an associate member of the Canadian Institute (now, the Royal Canadian Institute) and four years later he was a member of the Council of its Biological Section. Possibly this introduced him to the advantages of such associations and induced him to join the American Ornithologists' Union. At any rate he was elected an Associate of the Union in 1893. There is no record concerning his first attendance at an annual session of the Union but we know he was absent on only four occasions from 1906 to 1938 inclusive. Few members have been more faithful or of greater service to the American Ornithologists' Union.



On December 8, 1897, James Henry Fleming married Christine MacKay Keefer at The Manor House, Rockcliffe Park, Ottawa. Their residence was established at 267 Rusholme Road, Toronto, Fleming's parental home since 1892. This is the address which was to become so familiar to ornithologists. In this home, two children were born to them: Annie Elizabeth in 1899 and Thomas Keefer in 1901. Here also lived his widowed mother. Though personally unfamiliar with the home in those days, I can imagine the punctual orderliness and substantial living which prevailed. But this family circle was soon to be broken,—his wife, Christine MacKay, died in 1903.

About the close of the last century organized local natural-history interest had fallen into a decline. The Biological Society of Ontario collapsed, apparently in 1894, the year during which its last publication was printed, No. 4, of the 'Biological Review of Ontario.' In that number there appeared a short article by Fleming describing a male Cory's Bittern which he states "was shot on August 17, 1894, on Ashbridges Bay, Toronto, by Mr. Harry Day and *is now in my possession.*" The words which I have italicized were to be used by Fleming a good many times subsequently. He certainly was an alert and diligent collector, and fortunately for natural history he assumed the responsibility which a public institution might have been expected to assume. A rather starved and dusty Provincial Museum, housed in the Normal School at Toronto, represented the official response to an apparently weak public demand for such an institution. Fleming was by nature not the person to promote and organize support for a public museum, and we must remember that there was no large annual crop of new bird-watchers in those days and consequently there were few kindred spirits which mean so much in the study of natural history.

So, Fleming created a one-man museum. He not only had the interest, the knowledge and foresight, but also the means. What had been a seed-growing acreage on Elm Street became valuable property in the center of a large and growing city. This circumstance together with other good fortune, rendered him independent; he could travel, buy collections and books, study and keep up the ornithological contacts made in many parts of the world, with only occasional attention to other matters.

For a time Fleming supported a local taxidermy business managed by the late Oliver Spanner. His motive was strictly non-commercial; he wanted facilities for the preparation of cabinet specimens and a

means of keeping in touch with natural-history events. The plan was practical and successful. Sportsmen over a wide area furnished him with information on the annual abundance of animals, on unusual flights of birds, and on the occurrence of rarities. In fact, the Yonge Street 'shop' became a kind of ornithological clearing-house. Here the local naturalists gathered. Among them was Fleming's life-long friend, P. A. Taverner, who has since distinguished himself as an ornithologist. Taverner credits the establishment with being a 'school' where the foundations of scientific ornithology of fifty and forty years ago were taught, and states that "matters of heaven and earth were discussed there, but largely ornithological."

The taxidermy shop in days gone by was an important concern in a community. To borrow the words of a friend, "it served natural-history interests in much the same way as the country store served politics." These old associations never dropped from Fleming's most cherished memories although he discontinued his support of the concern when, with changing conditions, it ceased to serve his purpose. Fleming never quite reconciled himself to the modern museum studio and laboratory and he retained a fondness for a 'stuffed' animal which was not dispelled by a splendidly sculptured one.

Fleming was neither a practised preparator nor what we call a field man,—partly for constitutional reasons and also because of the pressure of other things to do. But he did enjoy direct observation of living birds in the field. He collected and studied in Parry Sound and Muskoka districts and made occasional trips to other areas in southern Ontario such as the Bruce Peninsula, Kettleby in King Township, Niagara Glen, and Point Pelee. A. O. U. meetings were the occasion for glimpses of the field in more distant places, and in 1907 a special trip was made to Tennessee. Between 1889 and 1893, he travelled extensively in Europe and also to British Guiana and the West Indies. These trips were not strictly ornithological field expeditions but they served to widen his acquaintance with living birds and afforded opportunities to gather impressions of regions from which his specimens came or were to come.

In 1908, Fleming married Caroline Toovey of Towersey, Oxfordshire, England. This partnership was a delight to him, to his children and to his friends. Mr. Fleming managed the Museum, an annex to their house which demanded the addition of three rooms completed in 1925, and his wife managed the home. Altogether, the atmosphere of 267 Rusholme Road was most pleasant and comfortable, as will be vouched for by dozens of visiting ornithologists.

It was here that I first met Mr. Fleming. As a rather callow ornithologist and fellow museum worker, I made an appointment and called on him. I had no particular business objective, merely a desire to meet a well-known figure in my field of interest, but one who was then inexplicably outside the Museum organization with which I had become connected. It was not Fleming's nature to radiate an effusive welcome to strangers but at least I felt at ease. So far as the impressions gathered at that meeting are concerned, I can only speak of my own. This dignified and bearded man seated before me at his desk seemed kindly, yet stern. His questions were casual and conversational, so much so that I do not remember them, but I know now that they were purposeful and searching. From that day to within a few days of his death, a period of nearly twenty years, it became my habit to visit Mr. Fleming with increasing regularity. I cannot say just when the slight barrier between us, due to his natural reserve and to the disparity in our ages and experiences evaporated, but I feel that it did and much to my profit. I shall always be thankful for his warm, sincere friendship, appreciative of his wisdom, and mindful of the associations in his study and bird rooms. One's nose is a most valuable instrument. Whenever I sense that pleasant perfume, for such it is to me, compounded of old books, tobacco smoke, naphtha and seabirds, memories of Fleming and his museum will be recalled.

I have already mentioned that Fleming was, at the time I met him, a well-known figure in ornithological circles. As early as 1905, he had attended the International Ornithological Congress in London. Subsequently he served on its committees and attended their meetings as official representative of Canada,—at Copenhagen in 1926; Amsterdam in 1930; Oxford in 1934; and Rouen in 1938.

Fleming was made a Member of the American Ornithologists' Union when that class was established in 1901. He was elected a Fellow in 1916. From 1923 to 1926, Fleming was a member of its Council where his wide ornithological knowledge and his sound judgment in matters of finance were no doubt very valuable. From 1926 to 1932, he was a Vice-President of the Union. He was elected to the Presidency at the second Canadian meeting of the Union, at the city of Quebec in 1932. He held this office until 1935. Fleming regarded the honor as a mark of recognition to Canadian ornithologists in general. Although the Union has had more dominating leaders, it has never had a President more sincerely interested in its welfare. He presided at the business session without the liking for, or

particular skill in conducting formal procedure but his brief and quiet manner commanded respect. I know that the demands of the office, its prominent and public rôle, created conflict within him and taxed his physical and nervous strength.

Fleming's standing as an ornithologist was recognized in many ways. The National Museum of Canada made him Honorary Curator of ornithology in 1913. He was elected British Empire Member of the British Ornithological Union; Corresponding Member of the Zoological Society of London; and Member d'Honneur Étranger Société Ornithologique et Mammalogique de France.

Local recognition, as is so often the case, came to him later in life. He was an Honorary (but active) Member of the Brodie Club; an Honorary Member of the Toronto Ornithological Club; Honorary Vice-President of the Toronto Field Naturalists' Club; and in 1927, he was made Honorary Curator, Division of Birds of the Royal Ontario Museum of Zoology.

The enumeration of these honors, though incomplete, serves as a measure of Fleming's attainments. More evidence of accomplishment can be gained through reference to the bibliography of his writings which is appended. These titles suggest his interests to a considerable extent, but do not cover their scope or adequately convey the extent of his contributions, or picture the rôle of usefulness which he played in the study of birds. Fleming was a helpful accessory to a good deal of ornithological work as has been acknowledged by authors during the past forty years.

Fleming as a collector represented an era in ornithology when individuals devoted their lives and fortunes to the accumulation and preservation of specimens and facts,—the primary function of a museum. I have already mentioned that he possessed the means, the knowledge, and the foresight to make a major contribution to science in this work. In addition, his enthusiasm, his memory, and his constant, patient persistence served him well. Let me tell one amusing story which illustrates this point:

The only Toronto record of the Curlew Sandpiper (*Erolia testacea*) was based on a specimen shot about 1886, by —, and there our story begins. This bird, a mount, was displayed in a case in a local gun club. Fleming knew it well. Each of two hunters claimed to have shot it. This led to a rather heated dispute between them which, one day, culminated in a scuffle during which the case was broken into. The bird disappeared. One of the contestants had rather ruthlessly extracted it and when the smoke cleared, part of

one leg was discovered attached to the artificial rock-work of the case and the head was found on the floor. The head was taken by someone to Samuel Herring, the local taxidermist, who had mounted the bird. Fleming, who had learned the details of the bird's dismemberment, eventually acquired the head for preservation about 1894. On February 2, 1911, Fleming recognized the body of the Curlew Sandpiper in a case of mounted waders in the possession of George Pearce (1). Pearce revealed that he had obtained it from the shooter who had escaped with it from the gun club. In the meantime the body had acquired a new head and a new leg, apparently from a Red-backed Sandpiper. All trace of this case of birds was lost until October 4, 1932, when it was discovered in a local school-room. The specimen (mostly Curlew Sandpiper) was still in it. Through proper channels it was removed and transferred to the Fleming collection. Thus were body and head of the only Ontario specimen of the Curlew Sandpiper reunited after more than forty years, in that haven of rarities, the Fleming collection. The above story, aside from illustrating Fleming's perception and persistence, suggests with what pleasure and satisfaction he sometimes collected.

Fleming was an ornithological historian. What he knew about collectors, collections, expeditions, ornithologists and their work, was tremendous. He knew the peculiarity of a collector's 'make' of skin, his labels, handwriting, where and when he had collected, and particularly, what had become of his collection. He could tell many interesting anecdotes concerning the history of individual specimens or of whole collections. Perhaps, as is so often the case, Fleming thought these details too insignificant to be worthy of permanent record, or perhaps by the time he had acquired this store of information he then lacked the energy necessary to sift and compile it and see it into print. A volume of facts and lore died with him, but all men leave work unfinished.

Fleming was an ornithological adviser and stabilizer. His opinions were usually conservative and firmly held. Often he would introduce unusual points into a discussion born of his wide knowledge and interest in birds of the world. He knew well when points were unproven and candidly cautioned against overstatement. He consistently used his influence to moderate and avoid controversy. After a dignified and quiet interjection he would retreat from any issue resembling a quarrel. He was, above all, a gentleman.

Fleming was most thoughtful toward others. No letter was left unanswered; a paper received was acknowledged (and a high per



cent of this literature was read); a piece of work well done was rewarded by his comment. A news clipping, a cartoon, or perhaps a trinket, which he thought appropriate to an occasion was duly forwarded to the proper person, usually accompanied by a brief but sparkling comment; and Fleming had an extraordinary sense of the appropriate, a natural wit and a mellow humor.

It has not been possible here to attempt more than a sketch of the personality and life work of the one we have lost. It is not from lack of data; his letters, his diaries (started in 1888) and scrapbook would all add something to the story of his habits, his work and his philosophy. Many times I have noticed a portfolio which rested for years within arm's reach of his desk. It is labelled "Notes, of no value except to myself." The news clippings, announcements, poetry, jokes, personal notes, etc., in that volume, would certainly yield a chapter for a more extended review. His notes on birds and bird observations were kept up to date until near the end. On his desk at the moment I am writing,—the desk which for years faced the big window overlooking the lovely garden,—there is a slip of paper on which is written in pencil: "June 3, 1940. Connecticut Warbler in greenhouse." Except for reading letters from his friends which he regretfully could not answer, this memo marked the close of his work with birds and students of birds.

The big harvest of Fleming's life work is yet to be emphasized. The Fleming collection of bird specimens stands as a major contribution to ornithological research and eloquently attests to the discerning and informed curatorship which built it. To the best of my knowledge it is the most representative private collection of the birds of the world. A few details will reveal its importance. All families of modern birds are represented except Pedionomidae, Raphidae and Atrichornithidae. An estimate of its generic representation totals 2,073. All told, it comprises 32,267 specimens. It includes several types and a surprising number of paratypes, topotypes and so on. Vanished and vanishing birds are particularly well represented, some in series. The ornate, the grotesque, the specialized and the primitive all appealed to Fleming's interest and each is adequately represented. Altogether, the Fleming collection is a rich store of facts which have served, and which will continue to serve ornithological research.

The Fleming library is outstanding. It includes most of the modern reference books on birds in the English language. Complete sets, or nearly complete sets, of ornithological periodicals constitute

an invaluable file. And then there are numerous rarities, obscure publications and editions which are of great historical value and constitute the delight of the bibliophile. In addition, the Fleming library includes one of the most valuable collections of bound ornithological separates to be found in any library.

Although we are now to be deprived of the rich and varied store of information which James Henry Fleming's mind possessed, his contributions to our literature, his specimens and books, and the countless interesting ornithological odds and ends, remain to enrich our science. His collections, though privately possessed, had been thoughtfully and generously held in trust for the eventual enrichment of a Canadian institution (The Royal Ontario Museum of Zoology, Toronto), indeed for the benefit of all mankind. They represent a life-long labor of love, and in our analysis, a monument to the man.

## BIBLIOGRAPHY

- 1890. Bald Eagle in Muskoka. *Proc. Canadian Inst.* (3), 7: 185.
- 1890. Arrivals on April 17 [1889]. *Proc. Canadian Inst.* (3), 7: 191.
- 1890. Olive-sided Flycatcher at Toronto. *Proc. Canadian Inst.* (3), 7: 192.
- 1890. Arrivals, June 1, [1889]. *Proc. Canadian Inst.* (3), 7: 193.
- 1890. Field Sparrow nesting. *Proc. Canadian Inst.* (3), 7: 193.
- 1893. [A list of the birds of Ontario, in 'Catalogue of Nat. Hist. Exhibits, World's Columbian Exposition'], pp. 1-26.
- 1894. *Ardetta neoxena* at Toronto. *Biol. Rev. Ontario*, 1: 85.
- 1900. Ontario bird notes. *Auk*, 17: 176-177.
- 1901. A list of the birds of the districts of Parry Sound and Muskoka, Ontario. *Auk*, 18: 23-45.
- 1901. Nesting of Co.'s Bittern at Toronto, Ontario. *Auk*, 18: 106.
- 1901. European Lapwing in the Bahamas. *Auk*, 18: 272.
- 1901. Correction to 'Birds of Parry Sound and Muskoka.' *Auk*, 18: 276-277.
- 1902. Cory's Bittern. *Auk*, 19: 77-78.
- 1902. American Avocet and American Three-toed Woodpecker at Toronto. *Auk*, 19: 79.
- 1902. Further notes on the Snowy Owl in Ontario. *Auk*, 19: 400.
- 1902. Notes and additions to 'Birds of Parry Sound and Muskoka.' *Auk*, 19: 403-404.
- 1903. Recent records of the Wild Pigeon. *Auk*, 20: 66.
- 1903. Turkey Vulture at Moose Factory, James Bay. *Auk*, 20: 66.
- 1903. Breeding of the Evening Grosbeak in captivity. *Auk*, 20: 215-215.
- 1905. An unusual migration of the Canada Jay. *Ontario Nat. Sci. Bull.*, 1: 11-12.
- 1905. An unusual migration of ducks in Ontario. *Auk*, 22: 206-207.
- 1906. The unusual migration of Brünnich's Murre (*Uria lomvia*) in eastern North America. *Proc. 4th Internat. Ornith. Congress*, 1905, pp. 528-543.
- 1906. An arctic record for the American White Pelican. *Auk*, 23: 218.
- 1906. Robin notes. *Ontario Nat. Sci. Bull.*, 2: 10-11.
- 1906. Range of the Sharp-tailed Grouse in eastern Canada. *Ontario Nat. Sci. Bull.*, 2: 19.

1906. Chuck-will's-widow and Mockingbird in Ontario. *Auk*, 23: 343-344.
1906. Birds of Toronto, Ontario. Part I. *Auk*, 23: 437-453.
1907. Birds of Toronto, Canada. Part II. *Auk*, 24: 71-89.
1907. The Fulvous Tree-duck in British Columbia. *Ottawa Nat.*, 20: 213.
1907. The disappearance of the Passenger Pigeon. *Ottawa Nat.*, 20: 236-237.
1907. Birds observed in Hawkins County, east Tennessee. *Wilson Bull.*, n. s., 14: 154-157.
1908. The destruction of Whistling Swans (*Olor columbianus*) at Niagara Falls. *Auk*, 25: 306-309.
1908. Dates that are not data. *Condor*, 10: 91.
1908. Ontario bird notes. *Auk*, 25: 486-487.
1908. The cotton-tail rabbit in Ontario. *Ottawa Nat.*, 22: 158-159.
1911. A new teal from the Andaman Islands. *Proc. Biol. Soc. Washington*, 24: 215-216.
1912. The Ancient Murrelet (*Synthliboramphus antiquus*) in Ontario. *Auk*, 29: 387-388.
1912. Sabine's Gull on the Mississippi River. *Auk*, 29: 388-389.
1912. The Niagara swan trap. *Auk*, 29: 445-448.
1913. Mammals [in 'The Nat. Hist. of Toronto Region, Ontario, Can.'], pp. 206-211.
1913. Birds [in 'The Nat. Hist. of Toronto Region, Ontario, Can.'], pp. 212-237.
1913. Ontario bird notes. *Auk*, 30: 225-228.
1914. An abnormal Rose-breasted Grosbeak. *Auk*, 31: 102.
1915. A new *Turnagra* from Stephen's Island, New Zealand. *Proc. Biol. Soc. Washington*, 28: 121-123.
1916. [Concerning English names of Redpolls.] *Ibis* (10), 4: 364.
1916. The Saw-whet Owl of the Queen Charlotte Islands. *Auk*, 33: 420-423.
1918. Ernest Douglas Wintle. *Ottawa Nat.*, 32: 118.
1919. The Costa collection of birds. *Condor*, 21: 39.
1919. Why Canada and the United States combined to stop spring shooting. [Leaflet, Dom. Parks Branch, Dept. of the Interior.]
1919. A supposed Californian-taken Trumpeter Swan. *Condor*, 21: 124.
1919. One reason for eliminating subspecies. *Condor*, 21: 239.
1919. Birds of northern Saskatchewan and northern Manitoba collected in 1914 by Capt. Angus Buchanan. *Canadian Field-nat.*, 33: 109-113.
1920. The Northern Bald Eagle, a probable Californian bird. *Condor*, 22: 110.
1920. A list of the birds collected in northern Saskatchewan and northern Manitoba by Captain Buchanan in 1914. *Ibis* (11), 2: 395-408. [Essentially the same as paper under similar title cited above.]
1920. [with Hoyer Lloyd]. Ontario bird notes. *Auk*, 37: 429-439.
1920. [with W. E. Saunders]. A. O. U. luncheons. *Auk*, 37: 498.
1921. Notes on the hypothetical list of Californian birds. *Condor*, 23: 95-96.
1922. The Starling, *Sturnus vulgaris*, at Toronto, Ontario. *Canadian Field-nat.*, 36: 15.
1923. Two anonymous pamphlets on Anticosti. *Canadian Field-nat.*, 36: 31-32.
1923. The proportions of the sexes in collections of bird skins. *Condor*, 25: 108.
1923. Why Canada and the United States combined to stop spring shooting. *California Fish and Game*, 9: 101-102. [Reprint of Dom. Parks Branch leaflet cited above.]

1924. A new antarctic form of *Larus dominicanus* Lichtenstein. Proc. Biol. Soc. Washington, 37: 139.
1924. The California Condor in Washington: another version of an old record. Condor, 26: 111-112.
1925. "Priority," a prophecy. Condor, 27: 240.
1926. The arctic collections of the Victoria Memorial Museum. Proc. 6th Internat. Ornith. Congr., pp. 80-83.
1926. Lloyd's degreasing apparatus. Journ. Mammalogy, 7: 62.
1926. "Birds of western Canada" [Review]. Canadian Field-nat., 40: 185-186.
1927. Notes on the bibliography of the late Charles William Nash. Canadian Field-nat., 41: 137.
1929. Jonathan Dwight. Ibis (12), 5: 528-530.
1930. In memoriam: Jonathan Dwight. Auk, 47: 1-6.
1930. Ontario bird notes. Auk, 47: 64-71.
1930. Chestnut-backed Chickadee in Lake County, California. Condor, 32: 69.
1930. "Ornithological investigations near Belvedere, Alberta, 1926." [Review.] Canadian Field-nat., 44: 170.
1930. "Birds and mammals of the Mount Logan expedition, 1925." [Review.] Canadian Field-nat., 44: 170-171.
1932. "An introduction to the literature of vertebrate zoology." [Review.] Canadian Field-nat., 46: 97-98.
1936. A new genus and species of flightless duck from Campbell Island. Occas. Papers Roy. Ontario Mus. Zool., 1: 1-3, 3 plates.
1936. Eastern Mockingbird (*Mimus polyglottos polyglottos*) at Toronto, Ont. Auk, 53: 340.
1937. The Kentucky Warbler, an old Quebec record. Canadian Field-nat., 51: 13.
1937. Walter Brett: 1836-1917. Condor, 39: 60-61.
1938. George Frederick Dippie, 1873-1935. Canadian Field-nat., 52: 44.
1938. [On] "A new genus and species of flightless duck from Campbell Island." Ibis (14), 2: 590-591.
1939. [with L. L. Snyder]. On *Melospiza melodia* in Ontario. Occas. Papers Roy. Ontario Mus. Zool., 5: 1-8.
1939. The Great Lakes Ornithological Club. Wilson Bull., 51: 42-43.
1940. The Normal and Model Schools of Toronto and their relationship to the Provincial Museum. [In the Royal Ontario Museum of Zoology (A history of)] Roy. Ontario Mus. Zool. Con., 18: 42-44.

*Royal Ontario Museum of Zoology*  
*Toronto, Ontario*

## BREEDING BIOLOGY OF SILVERY-CHEEKED HORNBILL

BY R. E. MOREAU, C.F.A.O.U., ETC., AND WINIFRED M. MOREAU

## INTRODUCTION

SOME account of the breeding of this hornbill has already been given (Moreau, 1936), with special reference to the building process. It was based on observations, totalling about four hundred hours, made at two nests in the evergreen forest of the East Usambara Mountains, Tanganyika Territory, latitude about 6° south. Since that account was published, and the information it contained compared with that available for other species of African hornbills (Moreau, 1937), further information, which provides a more nearly complete picture of the curious breeding biology, has been accumulated as a result of three more years' experience of the birds. During that period six hundred hours' records have been amassed, mainly by African observers working under our direction at the two original nest-holes and one other. The value of such Africans, able to write Swahili and costing little more than one penny an hour, has been stressed elsewhere. Their standing instructions are to note only the simplest routine items, such as the times of arrival and departure at the nest, but as they get interested they make on their own initiative other notes that often lead to an extension of the original investigations.

It may be useful to recall certain facts already recorded about this hornbill, which is an arboreal species characteristic of the mountain forests of eastern tropical Africa. The male, comparable in size with a Muscovy Duck, is distinguished from the smaller female also by his prominent casque, which is parchment-like in both color and consistency. For breeding, the birds which appear to pair for life, select a hole high up in some great tree and, like the other arboreal hornbills of Africa, constrict the entrance with plaster until only a slit wide enough to admit the bill is left. In *Bycanistes cristatus* all the actual plastering is done by the female, sitting inside the hole and using material produced by the male in the form of regurgitated pellets of soil. These he presents to her one by one in the tip of his mandibles, in sequences of up to four dozen at a visit. The pellets are apparently prepared in the male's gullet, with the aid of copious salivation, but the actual process is one that needs to be elucidated because it has been shown that the lumps of soil swallowed must be divided, and not merely rounded, after the male has swallowed them. Dr. P. R. Lowe has recently been good enough to make an anatomical examination of the necks of specimens obtained for the purpose, and he informs us



that he finds no specialization in the esophageal or laryngeal muscles or other structures.

During the nest-building the pair work continuously for several hours each day, the female remaining in the hole throughout the entire spell. Each afternoon she emerges and flies off with the male to roost elsewhere. Each morning she returns, and toward the end of the building has to struggle hard to pass through the narrowed hole, until the day comes when her morning's work has made it impossible for her to get out again without breaking the plaster away. Then she settles down in the nest to nearly four months of inactivity. We take the opportunity of countering once again, and with the greatest emphasis, the implication so repeatedly made in casual references to hornbill nesting, that the female is in any way compelled by the male to enter the hole or to stay there. In this species she does in fact normally remain until her offspring is fledged, and then she breaks away enough plaster to permit of exit; but exceptionally she has been observed to do the same thing after spending only a few weeks in the nest, without the male's showing any sign of disapproval.

During the whole period that the nest is occupied the male unaided is responsible for feeding the inmates. He brings cargoes of fruits, regurgitating them and passing them through the slit in the plaster one by one.

#### BREEDING DATES

As described elsewhere (Moreau, 1935), the East Usambara Mountains possess an equable tropical climate with a remarkable uniformity of conditions in the local evergreen forest throughout the year. The aspect of the foliage is unchanged and fruit of one sort or another is always available. In these circumstances it has been interesting to find that the breeding of the forest bird community as a whole is practically confined to less than half the year and egg-laying mostly to one quarter, with a peak about October (Moreau, 1936a). So far the hypotheses of a factor controlling the general seasonal breeding all seem open to fatal objections; but it has had to be admitted that we know nothing of the specific composition of any of the birds' food at any stage of the breeding cycle. In this connection it is of especial interest to ascertain how far the hornbills fit into this scheme of a short breeding season, because we now have evidence (see below) showing that nestlings can be reared by the parents on very different staple foods.

At the Ngua nest a female entered (finally sealed herself in) on November 10, 1934, and broke out on December 5; entered on Novem-

ber 6, 1935, and emerged with young on February 23, 1936; entered on October 27, 1936, and emerged with young on February 27, 1937.

At the Amani nest a female entered about November 7, 1936, and emerged on February 1, 1937; entered on November 6, 1937, dropped the shells of two eggs out of the slit on December 13, 1937, and deserted ten days later. Another entrance took place on November 3, 1938, and the female emerged on February 21, 1939.

In addition to these nestings of which the histories are known fully, we have notes of emergences at other nests on February 5 and March 13. Reckoning on a period of 107 to 120 days in the nest (derived from the records in the preceding paragraphs), we get again dates of entrance in October and November. Moreover, a young bird taken still naked from a nest-hole on January 6, 1937, was estimated to be ten days old, which, on the forty-day incubation basis suggested by the 1937 Amani nesting above, would give the date November 16 for the female's entrance.

Thus in the above eight nests the females' entrances all fell within a period of about three weeks centering around November 5, a remarkable phenomenon considering the uniformity of the environment. We have, however, an indication of occasional abnormality. On December 26, 1936, we saw a pair of these hornbills on the wing with two fledged young which must have come from eggs laid not later than mid-September. Even including this case, however, the egg-laying will all be covered by about ten weeks.

#### BREEDING SUCCESS

In the earlier account of this big hornbill's biology the question of the checks on its population was considered and the tentative conclusion was reached that they must be imposed by internal rather than external factors. Our further evidence strengthens this view. There is still no evidence that either predators or parasites take toll of the species. Shortage of big-enough holes might possibly impose some limitation, though in an extensive primary forest of very large trees this effect must be minimized. The results, summarized below, of five seasons' attempts to breed at one nest and three seasons' at the other indicate clearly that internal factors provide an important check. In all these cases the possibility of human interference can be eliminated and, moreover, we know that when the females had sealed themselves in, the males were not neglectful in bringing food.

#### *Amani nest:—*

1934. Pair built during most of November and then deserted.

1935. Sequence of events exactly as in 1934.

1936. Female was inside more than twenty days less than usual, so that probably no young were fledged. (The emergence, which took us by surprise, was not witnessed.)  
1937. Female deserted ten days after eggs hatched.  
1938. One young fledged.

*Ngua nest*:—

1934. Female deserted three weeks after she had entered.  
1935. One young fledged.  
1936. Two young fledged.

Thus, in five years at one nest only one young was certainly reared to fledging, though a total of three is possible; in three years at the other nest, three young were fledged. In view of the restricted egg-laying period demonstrated above for this species, it is certain from the dates on which unsuccessful attempts came to an end that the respective pairs had failed conclusively for the year; and hence it can be asserted that in eight pair-years only four to six young were raised to fledging. In the Amani attempts of 1934 and 1935, the breakdown seemed to be due to the fact that the breeding impulse was not strong enough to carry the pair through the labor of building and the male is suspected to have been the weaker agent of the pair (Moreau, 1936). The female was apparently responsible for the failure at Ngua in 1934 (unless she had been able to detect that she had infertile eggs and the fault was in fact the male's); and the female may have been responsible for the failure at Amani in 1937 (see description of behavior after emergence, *postea*).

NATURE OF THE FOOD BROUGHT TO THE NEST

The food of this species of hornbill at all ages is practically all fruit. As previously reported, at the Ngua nest in the seasons 1934-35 and 1935-36 most of the food brought by the male consisted of small stone-fruits, mainly *Sersalisia usambarensis* with some *Polyalthia oliveri* and a little of other fruits of different species and types. The following season witnessed a wholesale change in the staple fruits brought. At Ngua most of food remains that could be picked up under the hole were figs (*Ficus* spp.), varying in thickness from one-half to one and a quarter inches. Two of the bigger ones air-dry weighed 19.5 grams. Species occurring once or twice were: *Myrianthus arboreus* (a hard round compound fruit 1.5 inches thick), berries of *Harongana madagascariensis* (the size of haws), and the cultivated passion-fruit (*Passiflora edulis*).

During the same season an almost daily search was made for fruits

dropped at the foot of the Amani nest tree. After October 27, *Sersalisia* began to appear in the gatherings, and once *Polyalthia*, but the staple was obviously figs, especially a small one, apparently *Ficus natalensis*, a species very attractive to passerine fruit-eaters. Other native species that could be identified were: *Chrysophyllum msolo* (pulpy berry), *Parinarium Goetzeanum* (sphere about 1.5 inches thick, with a good deal of firm flesh), *Rauwolfia obliquinerva* (like a cherry), *Sapium ellipticum*, *Eugenia* sp. and *Odyndea Zimmermannii*. The last species, represented by a large ovate nut about 2.5 inches long and devoid of surrounding pulp, has several times been found under hornbills' holes, usually with the skin more or less bitten off. It seems doubtful whether such a 'fruit' could ever be digested. Two exotic fruits from the Research Station plantations had also been taken to the Amani nest, namely, *Dichopsis gutta* (gutta percha, a cherry-like fruit but with very little flesh) and the more nourishing *Maesopsis Eminii*. At the date this latter was brought (end of November) it was probably derived from the last fag-end of the annual crop of a plantation which each year in July and August affords the staple food of scores of these hornbills day after day. We have yet to prove that any other bird eats them and consequently it seems certain that to these hornbills must be attributed the distribution of this good timber tree (originally from Uganda) through the southern part of the East Usambara forests during the last dozen years. Occasionally small white objects that were not fruits have been seen passed into a nest. From one that was dropped it appears that they were the fleshy sweet-scented flowers of *Conopharyngia Holstii*, which may be acceptable as food.

We are indebted to Messrs. P. J. Greenway and F. M. Rogers, of the Research Station at Amani, for the identifications quoted above. A point of general interest is that in successive years broods were raised on widely different staple fruits.

#### SUPPLY OF FOOD BY THE MALE

Whatever the size of the fruits brought to the nest by the male, he always regurgitates and passes them through the slit one by one. The number carried at a single visit varies widely, irrespective of the size of the fruit, except that he cannot accommodate many of the larger at once. Any number from one to about twenty-five is a common cargo for him to arrive with, but much bigger numbers are not infrequent. The most ever recorded is 69 (small figs). It is not surprising that during this sequence the bird showed signs of wear-

ness, several times stopping to rest for a few moments and then resuming after a shake of the head.

At the only nesting previously recorded in detail (Ngua, 1935-36) the male's visits averaged twelve a day for the first seven weeks after the female's entrance, i.e., until shortly after the young probably hatched; then for about three weeks increased steadily, until in the fourth and fifth weeks before the female and single young one flew, an average was attained of 21. Over their last three weeks in the nest the visits averaged only 18, with 310 fruits (Moreau, 1936).

At the same nest in 1936-37, a dawn-to-dusk watch was kept one day a week for the last ten weeks before the female emerged with two young. The male's working day tended to be a little longer than in the preceding season, for he brought the last feed about eleven hours after the first, but he made appreciably fewer visits, as shown in Table 1. (In this table each figure is the complete day's total actually recorded, except those for February 7, which have been estimated from nine hours' observations. On that day the observer noted that he had vacated his post for a time owing to the appearance of a leopard.)

TABLE 1

| Date         | Number of<br>Days before<br>Emergence | Number of<br>Visits | Number of<br>Fruits |
|--------------|---------------------------------------|---------------------|---------------------|
| Dec. 13..... | 72                                    | 13                  | 166                 |
| Dec. 20..... | 65                                    | 13                  | 175                 |
| Jan. 3.....  | 51                                    | 14                  | 201                 |
| Jan. 10..... | 44                                    | 12                  | 243                 |
| Jan. 17..... | 37                                    | 15                  | 276                 |
| Jan. 24..... | 30                                    | 17                  | 309                 |
| Jan. 31..... | 23                                    | 18                  | 307                 |
| Feb. 7.....  | 16                                    | 20                  | 280                 |
| Feb. 14..... | 9                                     | 18                  | 165                 |
| Feb. 21..... | 2                                     | 15                  | 152                 |

The numbers of fruits brought in this second year were also smaller than in the first, but they were not fully comparable because, as stated in the preceding section, the staple species were different. There is, however, no doubt that the *Ficus* spp. bulking so large in the 1936-37 food would have a much smaller proportion of waste than the stone-fruit that was brought in larger numbers in 1935-36.

The data indicate that while there may have been a reduction in the male's industry toward the end of the fledging period it was not so obvious as in 1935-36; but the records in Table 2 obtained in 1937 at another nest, which may be called C, suggest that such a



reduction is a usual feature with this hornbill. The female and single young bird emerged on March 13 and on each of the preceding thirty days observations were made for either the half or the whole day, to a total of 250 hours altogether. To arrive at the data for the table the half-day totals have been doubled, a procedure that is safe since the whole-day records show no diurnal rhythm in the male's degree of industry.

TABLE 2

| Period              | Days before<br>Emergence | Average Number of |        |
|---------------------|--------------------------|-------------------|--------|
|                     |                          | Visits            | Fruits |
| Feb. 11-26.....     | 30-15                    | 19.5              | 181    |
| Feb. 27-Mar. 5..... | 14-8                     | 18                | 148    |
| Mar. 6-12.....      | 7-1                      | 11.5              | 111    |

The maximum and minimum daily number of visits in the first period were 25 and 13; in the second, 22 and 14; in the third, 16 and 9. In this instance the definite nature of the male's slackening is emphasized by the fact that from March 6 onward he made one or two visits a day without bringing any food, a thing not recorded of him at any earlier date. The impression that he was getting tired and impatient was further heightened by the fact that beginning on March 5, he was several times observed to rap on the plaster.

At the Amani nest in 1936-37, five complete days' observations were made during the period before the young were hatched (about December 15). The male's visits then averaged 16 (maximum 18, minimum 13) and the number of fruits 223. Thus the number of visits made to the female alone was about the same as to the female with two young in the Ngua nest this same season. After the young had been hatched the male's visits did not at once increase (thus agreeing with the other data for the same stage, those from the Ngua nest 1935-36); for on December 22 and 24, the complete days' visits totalled 14 and 19, respectively. Thereafter, however, the male's industry increased. In eight complete days' observations during the next five weeks, which ended with the opening of the nest, the visits averaged 22 a day (maximum 27, minimum 14) and the number of fruits 191. The visits were more numerous than at the same stage of the other nestings recorded and, moreover, there was no reduction in the male's industry toward the end. But in this respect the nesting is not comparable with the others: the hole was found open only 84 days after the female had entered, i.e., the male had been on duty for 23 to 36 days less than usual. Indeed, as already stated, it is doubtful whether any young could have been reared.

On a review of all the available data on the activity of the male it appears that:—(1) the male's visits become more frequent after the hatching of the eggs, but not immediately; (2) the number of visits in a day shows no close correlation with the number of birds that are being fed. The daily total when the female is alone has varied from 10 to 18, when she has one young from 9 to 25 and when she has two young from 14 to 27. (3) The male's industry slackens in the last fortnight of 15 to 17 weeks' labor.

In connection with the foregoing results it is worth emphasizing that males of the Bucerotidae (except the Ground Hornbills, *Bucorvus* spp.) are in a peculiar position, perhaps unique among birds, as regards the receipt of stimuli from the family for which they are providing. The narrowness of the slit must often combine with the internal depth of a nest to prevent the male from seeing his offspring for at least several days after they are hatched. However, at any rate at first, they must receive their food from the female; but they develop an upright tripodal pose quickly, before a single feather appears, and thereafter they would not necessarily be incapable of receiving food direct from the male parent. It may be remarked parenthetically that the young hornbills have no sort of 'directive marks,' no brightly colored gape nor patterned tongue.

It would seem that in *Bycanistes cristatus* vocal stimuli can be of little or no importance. In our experience the young at any stage in the nest utter their hunger call infrequently and then, so far as we can tell, practically only when the male has arrived at the hole. In any case a male spends nearly all his time out of earshot of this call. Moreover, the female's braying, which carries much farther, is rarely uttered in the nest. She does not as a rule respond to the call of her mate or of other hornbills, if it happens to be uttered near. On the other hand we know of two occasions, both at nest C, where the male made a definite response to the female's call. He had taken food to the hole and was sitting in the upper branches of the nest-tree when she brayed. At once he dropped down to the hole and began peering inside, though apparently nothing else happened. At other times in similar circumstances he and other males have seemed entirely unresponsive.

#### SUPPLY OF INEDIBLE ITEMS BY THE MALE

It has already been described how at the Ngua nest 1935-36 the male went to a good deal of trouble to knock off pieces of bark from neighboring trees and bring them to the nest-hole. Before the young were hatched this happened only occasionally, and by no means every

day, but thereafter the number brought averaged three a day and it was only in the last ten days before the young flew that the male failed to supply his family with any bark. We now know that this habit is characteristic of the species, but at most nests the bark seems to be brought less regularly and in smaller quantities than was described above. At the same (Ngua) nest in the new season six pieces were recorded in ten full days' watching. At nest C they averaged about two a day till a fortnight before the young flew and then ceased. (This is what happened in the Ngua nest 1935-36 and is evidently another symptom of the male's weariness after over one hundred days of supply duties.) At the Amani nest 1936-37 one piece of bark was brought nearly every day (only once two), both before and after the young hatched. Occasionally, as might be expected, a male miscalculates the size of the piece he can pass through the slit. Then we have seen him break it up, drop the surplus, and pass the remainder. At all the nests we have studied the male only occasionally brings a stick and passes it in.

We still do not know for what purpose these inedible items are carried to the nest. The female does not hesitate to accept them. (And in this connection it is noteworthy that so far as we can tell the male is never content merely to drop through the slit anything that he has brought, whether it be food or not; if for any reason the hen inside is not ready to take fruit or a pellet of building material he will offer it again and again.) From the debris removed from a nest that was opened (see below), it appears that no large pieces of bark are retained in the nest, and there is no reason to believe that bark plays any part in nest-sanitation; but we think it likely that some of it is broken up very small indeed by the inmates. We are inclined to suggest that the bark, the sticks and the big *Odyendya* nuts (see *antea*) may be supplied simply as playthings, for we have seen a male on a treetop play with a lump of bark, tossing it and chewing it until it was all broken up and then going to get another piece, which he carried straight to the nest.

#### OTHER POINTS IN THE MALE'S BEHAVIOR

The surprisingly sanitary state of the nest interior (see below) is evidently due to several causes, among them to expulsion of feces through the slit and the fact that 'cast' fruit-stones and other rubbish are thrown out periodically by the female. The male sometimes assists. During one of the female's bouts of cleaning, the male sat outside the hole, received the rubbish through the slit piece by piece and dropped it to the foot of the tree (it turned out to be bits of

rotten wood). Such assistance was clearly gratuitous; it cannot have been in the least necessary or even helpful; but, as noted in the original account of these birds' breeding, the collaboration of male and female in the nest-building is peculiarly close and their awareness of each other at all times (they evidently pair for life) seems exceptional. In this connection it is noteworthy that we have practically never yet seen a male enter a hole. He will take the keenest interest in an interior, thrusting in his entire head and neck and peering about inside for minutes at a time, both before the nest has been plastered and also after it has been vacated, but further than that he will not go, although there is plenty of room for him to do so. The same thing happens on the occasional inspection of a hole that a pair may make at any time of the year.

It seems rare, too, for a male to roost in his nest-tree. As a rule he goes right away after bringing his last feed, well before sunset, and he makes his first appearance in the morning from a distance. Probably he joins a roosting party. These are, however, at their greatest at the end of the breeding season, when we have counted 159 of these big birds arriving down one of two convergent valleys to pitch in a tall *Albizzia*.

The attitude of the males to predacious birds varies greatly with the species. They show fear of the powerful but clumsy Vulturine Fish-eagle (*Gypohierax angolensis*) and if they are at the nest-hole when one passes they take cover. Incidentally, Amani is probably the only place in Africa where these two species can ever meet. The big Harrier-hawk, *Gymnogenys typicus*, is ignored by the hornbill. It is a feeble species, but one that takes a most unhealthy interest in nestlings in holes in trees, an investigation facilitated by the naked sides to its head. We once saw one at an occupied hornbill's hole while the male was away, but it was baffled by the extent to which the entrance had been narrowed by the plaster; and in any case the brooding female would have been able to put up a strong defense. A small brown eagle, probably *Aquila wahlbergi*, is always angrily driven off by a male hornbill. We have never seen an encounter with the most formidable bird of the forest, *Stephanoaëtus coronatus*. At the other extreme, it may be mentioned that this hornbill is a perennial butt of the pugnacious drongos, both *Dicrurus adsimilis* and *D. ludwigii*, which can be a nuisance to a busy hornbill. He is incapable of making any retaliation and the attacks seem entirely unjustified. We have no evidence that this hornbill attacks small birds' nests as many other species of the family do.

Hornbills other than the working male do not visit a nest-hole and, so far as we can tell, they settle in a nest-tree only by accident. At nest C this happened rather often during the last month the nest was occupied. The owner was never seen to take any notice of a visiting female or of an itinerant party, but he always attacked a solitary male. This was witnessed on February 17; on February 19, when he launched himself silently at the stranger and drove him away yelling; on February 25, when the intruder stood his ground better and the two birds met for a moment with a noise from their great bills; and on March 7, when the stranger was chased down into a neighboring valley. Finally, on March 11, two days before the family emerged from the nest, the owner was sitting on a neighboring tree when a stranger alighted in the branches well above the nest. At once the owner went for him with such fury that, according to the African observer, the stranger in his headlong flight struck the telephone wire. The owner then flew to the hole and presented one fruit.

#### EMERGENCE FROM THE NEST

An African observer has given a brief description (Moreau, 1936) of how the female and young flew out of the Ngua nest at 09.04 on February 21, 1936. A similar account was given to us by another African who witnessed the flight from the same nest at about 08.00 on February 23, 1937.

Another African account obtained at nest C on March 13, 1937, and recorded in Swahili, is worth giving in condensed form. At 06.20 the male arrived, gave a tap on the plaster (a thing he had done at intervals for the past three days) and flew away again without offering any food. Between 07.12 and 07.18 the female knocked the plaster away and then sat on the rim of the hole until the male came back at 07.24. They then flew away together. Almost at once the male returned to the hole, the baby put its head out and then, apparently without any persuasion, it flew out in the wake of its father as he went to join the mother. At 07.40 both parents flew off out of sight, leaving the baby where it had perched. Five minutes later they returned, the male to feed the baby, the female to sit on a neighboring tree. At 08.03 the male went to look into the hole and for ten minutes continued to peer inside. From then till 08.50 the male paid several visits to the baby and to the female, still each sitting in a different tree. Eventually, at 08.50, she flew away, the baby followed her and the male brought up the rear. They do not seem to have returned to the hole at all.



Finally we ourselves were able to watch the opening of the Amani nest (eighty feet up in a *Parinarium* tree) on February 21, 1939:—

07.20. Female began to knock away the plaster. Male came near and called from time to time, but brought no food. (As usual the female worked only until she had knocked away enough plaster to give her room to get out.)

08.15. Female emerges (having been in for 111 days) and at once flies to a tree a few yards away. A baby comes to the entrance of the nest and sits with its head out.

08.16. Male arrives, gives baby three fruits and departs; female sits on her tree and calls.

08.22. Both old birds perch alongside the hole. They keep putting their heads in and stroking baby's head and neck with their beaks. Male knocks off a lump of plaster and passes it to female who drops it. Male keeps putting his open beak at the base of baby's and stroking it heavily toward the tip. Three times baby nearly overbalances but not quite. At last male reaches in over baby's back and apparently pulls on its rump, upsetting its balance. As it falls outward the male flies off and baby follows. It flies unevenly though not losing height; but when male alights on a branch thirty yards from the hole, baby is unable to do so and continues for as far again before making a clumsy landing on another branch.

08.40. Both parents return to the hole, leaving baby where it alighted. The mother seems weak, sits with her wings drooped to catch the morning sun on her back while he peers repeatedly into the hole. She looks shabby and does not seem to be in new plumage.

08.50. Both join baby. Eventually they all fly off together. (As in other cases all the evidence is that the family never returns to the nest.)

When the female deserted the Amani nest in 1937 ten days after the eggs had hatched, she broke her way out between 08.00 and 12.30, when no one was observing. There was no means of knowing whether the young were alive or dead, but all that day the parents were about. At 13.50 the male was on the boss above the entrance, continually bending down and pushing his head inside, but apparently not regurgitating. Two minutes later the female arrived, flying normally, sat on the boss opposite the male, and they 'kissed.' The female then regurgitated two fruits, one after the other, which the male took and apparently proffered in the hole. It could not be seen what happened to them. Just afterward he regurgitated a fruit which she tried to take from the tip of his bill. He refused to let her have it and swallowed it himself. This happened twice before they flew away. At 14.38 and 15.16 the birds visited the tree again; on both occasions the male spent some time peering about with his head and neck inside the hole, while the female adopted a more detached attitude on the branches above. However, when at 15.40 and 16.20 they visited the tree again, the female both times went right inside the hole and stayed there for over ten minutes. At 16.40 they appeared

again, calling loudly. This time, while the female sat in the crown of the tree, the male, after repeatedly peering into the nest, started pulling out what looked like scraps of bark and stick. Later, both the birds sat on the boss, 'kissing,' peering inside and bringing out oddments, which they dropped. Eventually they flew away, and neither slept in the nest. The following morning, however, they visited it twice between 07.00 and 12.00, the male poking about in the hole as before, the female sitting higher up in the tree. Thereafter they lost all interest.

Certain generalizations of interest may be derived from these accounts:

(1) The emergences take place in the early morning. Including the Ngua nest desertion in 1934 we have five accurately timed emergences and all happened between one and three hours after sunrise.

(2) The females, after over 100 days' inactivity, the young birds from the moment of leaving the hole, fly well.

(3) The males show a keen concern for the young and also the greatest interest in the opened nest-hole, although they never enter it.

#### THE INSECT FAUNA OF A NEST

When a nest was opened to extract a young bird, all the loose material was scooped out and bagged. It consisted almost entirely of fragments of more or less rotten wood, certainly off the walls of the hole, and a few scraps of bark, but with no obvious dung, nor food remains; it was dry, inoffensive and in fact nearly odorless. It was carefully sieved and sorted and as many insects as possible were picked out. Through the kindness of Mr. N. D. Riley these have been identified at the British Museum (Entomology Department) by Mr. E. B. Britton, who has reported as follows:—

HEMIPTERA-HETEROPTERA: 86 adults and 37 nymphs of *Chilocoris laesicollis* Horrath (Cydnidae). The only members of the family Cydnidae of which any biological facts are known are phytophagous, living on the ground or burrowing into the soil at the roots of grass, etc. No explanation can be offered of their breeding in the hornbill's nest.

COLEOPTERA: Carabidae (1). 2 adults of *Oecornis nidicola* Britton (Ent. Mon. Mag., 76: 110, 1940). *Oecornis* is a peculiarly isolated genus, the nearest ally of which is probably the genus *Brachynopterus* Bedel, 1898, which was described from a single individual taken in Algeria. They probably feed on insect larvae. (2). 15 larvae of one species, probably of tribe Colliurini; probably predacious. Elateridae, 15 larvae of one species, probably Synaptinae; biology unknown.

Tenebrionidae, 35 larvae of a species of, or near, the genus *Alphitobius*, probably feeding on fungi and rotten wood.

LEPIDOPTERA: Psychidae, 201 larvae. (A normally phytophagous order.)

ORTHOPTERA: 43 nymphs of *Trichomera* sp. n. or closely allied genus; omnivorous.

DIPTERA: Acalypterae, four larvae.

Thus 438 insects were recovered from the hornbill's nest-hole and at least seven of the eight species represented were breeding there. At least two of the forms were new to science and the occurrence of two of the others was unexpected and denotes that their habits must be aberrant from the normal for their families. The probable value of collecting the contents of any hornbill's hole that may be opened is amply demonstrated.

On the same date the following year the contents of the hole were again collected. It would not have been so warm and dry as when the hornbills were in residence, but the main difference in the conditions of the interior would certainly have been the absence of food remains in various forms. The insect fauna had changed entirely since the previous year. Apart from scores of adult cockroaches of the subfamily Panchlorinae, there were only a few dipterous larvae of three species and elaterid larvae of one species. The abundance of insects breeding in the hole the first year thus evidently depended on the hornbills, and the thoroughly sanitary state of the nest must owe much to their scavenging activities.

#### SUMMARY

This supplementary account is based in the main on about 600 hours' observations.

The egg-laying in the East Usambaras is practically confined to about three weeks in the year, notwithstanding the uniform evergreen environment. Moreover, the details given of the fruits brought to the nest show that the staple species vary in successive years.

The population seems to be controlled mainly by internal factors; and in eight pair-years only four, or possibly six, young were reared to fledging, with no evidence that external factors contributed to the failures.

Males' visits to the nest with cargoes of fruit vary between 9 and 27 in the day. The number shows little correlation with the number of birds in the nest, but in any one nest it always increases a fortnight after the eggs have hatched. It increases again a fortnight before the

family emerges, i.e. when the male has been working for over thirteen weeks, and he shows other signs of slackness and impatience.

All males bring inedible objects, usually pieces of bark, to the nest once a day or oftener, probably as playthings for the inmates.

A working male will not allow another male to settle anywhere in the nest-tree. His reactions to accipitrine birds vary with the species.

Exits of mother and young are described. They always take place from one to three hours after sunrise. The mother, after over one hundred days of inactivity, and the young, at the first attempt, both fly well. The male attends to the young and also shows great interest in the opened nest-hole, although at no time in the entire breeding cycle does he enter it.

The interior of an occupied nest was sanitary and almost odorless; 438 insects were recovered from it. They belonged to eight species, mostly breeding there and mostly of special interest, being either undescribed species or aberrant members of their groups. They were probably beneficial scavengers.

#### REFERENCES

MOREAU, R. E.

1935. A synecological study of Usambara, Tanganyika Territory, with particular reference to birds. *Journ. Ecol.*, 23: 1-43.
1936. The breeding biology of certain East African hornbills (Bucerotidae). *Journ. East Africa and Uganda Nat. Hist. Soc.*, 43: 1-28 (part has been translated for publication under the title 'Die Brutbiologie des Nashornvogels, *Bycanistes cristatus*.' *Journ. f. Ornith.*, 87: 272-295, 1939).
- 1936a. The breeding seasons of birds in East African evergreen forest. *Proc. Zool. Soc. London*, for 1936: 631-652.
1937. The comparative breeding biology of the African hornbills (Bucerotidae). *Proc. Zool. Soc. London*, 107 (A): 331-346.

*East African Agricultural Research Station*  
*Amani, Tanganyika Territory*

NESTING OF THE GRAY FLYCATCHER<sup>1</sup>

BY HENRY N. RUSSELL, JR., AND ANGUS M. WOODBURY

THE history of the flycatchers of the genus *Empidonax* of the southwestern United States is confused. For *Tyrannula obscura* Swainson, Baird (in Baird, Cassin, and Lawrence, 1858: 200) proposed *Empidonax wrightii* as a substitute and designated a type specimen from El Paso, Texas. Among the group going under this name, Brewster (1889: 87) recognized the Gray Flycatcher as *Empidonax griseus* and the existence of two species became acknowledged. Under the name *E. griseus*, the Gray Flycatcher ran into further confusion.

Grinnell (1908: 78-82) reported it breeding in the San Bernardino Mountains of southern California, giving natural-history notes. He later discovered (1915: 93) that the species as envisaged at the earlier date was a composite including "in part *E. obscurus*, *E. wrighti*, and *E. canescens*" and observed that so far as known *E. griseus* occurred in California only in the southern deserts in winter. His natural-history notes from the San Bernardino Mountains must therefore apply to the more northern form, the Wright's Flycatcher.

Willett (1912: 65), in the meantime, considered all previous records of *E. griseus* in southern California as referable to *E. wrighti*. Dawson (1923: 896-900) after reviewing the literature and his own experiences, concluded that in southern California, "*griseus* is evidently the bird of the open sage and *wrighti* is the bird of the timbered mountains." He describes the nest and eggs of the Gray Flycatcher clearly for the first time.

Even at late as 1928, Mrs. F. M. Bailey (1928: 440) seems to have the habitat, nest and egg descriptions of the Gray Flycatcher hopelessly mixed with those of the Wright's Flycatcher, probably having adopted them from Grinnell (1908, op. cit.), the only reference she gave.

Linsdale (1936: 77) characterizes the Gray Flycatcher in Nevada as a "summer resident; restricted to sage-covered areas during the time of nesting, but wanders more widely in migrations"—clearly the same situation as in southern California.

Finally, Phillips (1939: 311) reports the discovery that Baird's type specimen of *Empidonax wrightii* is in fact a Gray Flycatcher necessitating a new name for the northern form called the Wright's Flycatcher, and relegating the very useful name, *E. griseus*, to the synonymy of *E. wrighti*.

<sup>1</sup> Contribution of the 1938 Rainbow Bridge-Monument Valley Expedition of the American Exploration Society.



The bird with which the present writers are concerned is the Gray Flycatcher, *E. wrightii* of Baird and *Empidonax griseus* of the 1931 'Check-list.'

In view of all this confusion, it is hardly surprising that the natural history of the Gray Flycatcher has not been clearly described. Dawson and Linsdale are undoubtedly correct about the bird breeding in the sage of southern California and Nevada. Our own experiences farther eastward have been rather different. We have had the opportunity of studying the Gray Flycatcher in the field in southeastern Utah and northeastern Arizona each summer from 1934 to 1938, and were fortunate enough in 1938 to find a nest in the making and to follow it through to completion of nesting activities. Various members of the expeditions have collected a dozen specimens of adults, juveniles, and nestlings, and have made many observations in the field.

It is a difficult bird to distinguish in the field from the other small *Empidonaces*, especially Wright's Flycatcher. The long narrow bill, almost completely yellow mandible, nearly completely white belly, and the very narrow, almost obsolete eye ring help in the identification. In young birds with fresh plumage, the white outer web of the outer tail-feathers is distinctive. Fortunately, the Gray Flycatcher is the only member of the genus seen in the pygmy conifers in July.

In the region studied we have found the bird to be fairly common in summer and well distributed in a specialized habitat. During the nesting season we have never seen it anywhere except in the pygmy-conifer forest (junipers and pinyons), in sharp contrast to its reported habits in California and Nevada. We did not find it in the sagebrush and greasewood flats until August.

Just how long it spends on the nesting ground we do not know, but broods of full-grown young deserted by their parents at the end of June indicate that a first nesting started before mid-May. A great scattering to the low flats greatly depletes the numbers in the pygmy conifers by mid-August. During this stay, according to our observations, two broods are raised, leaving the nest in June and early August, respectively. This is indicated by the presence of many broods out of their nest, being fed by adults in late June and early July when our expeditions generally reach the field, and is corroborated by our nesting observations of the second brood. We feel that the paucity of accurate information about the Gray Flycatcher justifies our reporting their nesting in some detail.

We observed a second brood from June 29 to August 3, 1938, from which we estimate that it takes about seven weeks to raise a brood.

A summary of the data and the schedule of development shows the following:

|                                       |                     |         |
|---------------------------------------|---------------------|---------|
| Nest building                         | June 29, 30, July 1 | 3 days  |
| Egg laying                            | July 2, 3, 4        | 3 days  |
| Incubation                            | July 5 to 18        | 14 days |
| Nestlings                             | July 18 to August 3 | 16 days |
|                                       |                     | <hr/>   |
|                                       |                     | 36 days |
| Feeding young out of nest (estimated) |                     | 14 days |
|                                       |                     | <hr/>   |
| Total                                 |                     | 50 days |

The nest was set on a horizontal branch of a juniper tree about four feet above the ground and on the south side of the tree. It was so well protected by the foliage as to be visible only from a small sector on the south side. The tree was located on a juniper-pinyon-covered slope near the foot of the Black Mesa, about one quarter mile southeast of our base camp at Marsh Pass, Navajo Co., Arizona, and some 500 feet higher, elevation about 6,700 feet.

The nest was discovered on June 29, 1938, and was about half completed. It was betrayed by a bird flying directly to it, remaining half hidden there for a minute or so in moderate activity and then departing by the same route to the south. At this stage the nest was nothing but a rather large, flat platform composed entirely of strips of juniper bark. On the following day the nest was nearly completed, but not lined. A bird visited the nest with a new strip of juniper bark about once in every ten minutes. On the third day, July 1, the nest was completed but empty and no bird was seen nearby. It is not known whether two birds or only one took part in the nest construction.

The bird or birds building the nest were bothered occasionally by some young birds which appeared to be begging for food. These were interpreted as members of a first brood which had not been completely weaned. By the time egg laying was in progress, however, the brood seems to have scattered, as several young birds were seen singly here and there among the junipers and pinyons nearby.

The finished nest was a rather rough, flattish, nearly circular affair not too compactly woven, which appeared rather too large for the bird. It was composed almost exclusively of strips of juniper bark, neatly lined with sheep's wool on the inside and draped on the outside with spider webs. It was so completely concolor with the juniper branch as to pass for a knot. It measured outside 100 by 80 by 52 mm. (4 by 3 $\frac{1}{8}$  by 2 inches), and inside 52 by 44 by 25 mm. (2 by 1 $\frac{3}{4}$  by 1 inch).

The first two eggs were laid on July 2 and July 3, respectively, and the third, and last, on the following day, although the nest was not visited on that day. However, on July 5 the set was complete and incubation in progress. On the occasions of the visits on July 2 and 3, the nest was deserted and there was no evidence of any flycatcher in the vicinity.

The eggs were immaculate white and somewhat translucent, giving them a definite pinkish tinge similar to that of the Mourning Dove's (*Zenaidura macroura*) egg. They were nearly elliptical in outline with but little tendency to enlargement toward one end. They measured 13.5 by 17.5 mm. (0.69 by 0.53 inches), 13.5 by 16 mm. (0.63 by 0.53 inches), and 14 by 17 mm. (0.67 by 0.55 inches). For purposes of identification the eggs were marked with one, two, and three black dots respectively.

Incubation began some time between 5.00 p.m. July 3 (two eggs), and 7.00 p.m. July 5 (three eggs), presumably after the third egg was laid some time on July 4, and continued until the morning of July 18. The nest was visited on July 5, 6, 7, 10, 15, 16, 17 and 18 during incubation and copious notes were taken. Careful watching of the nest, at first from 100 feet but later from 25 feet, continued on July 7 all morning from 8.00 a.m. to 12.17 p.m.; on July 10 all afternoon from 1.15 p.m. to 6.10 p.m., but only about half an hour on the other days.

So far as we could tell, the female alone incubated the eggs. Never at any time was there any evidence that the male assisted in any way. Only once did a bird believed to be the male approach the nesting area. He alighted in a tree about ten yards from the nest just at noon on July 7, and stayed there singing for about eight minutes. When he arrived, the female's head was already turned in that direction and she gave no indication by movement or otherwise that she was cognizant of his presence. Once again, on July 16, about 7.50 a.m., a male was heard singing about 200 yards from the nest.

Temperature problems at this time of year caused the female bird a good deal of trouble. In the early morning when it was cool, the bird appeared comfortable and sat quietly on the nest, but when a spot of sunshine penetrating the foliage above began creeping over her she commenced to show distress. The air temperature was 24° C. (76° F.), but in response to the sunshine she rose a little higher in the nest, spread the wings slightly and opened the mouth as if panting. From time to time the mouth was closed for a moment as if moistening the tongue or swallowing. During the three-quarters of an hour that it took the sun spot to pass, she opened and closed her wings several

times as if changing air, and shifted position in the nest with apparent intention of getting as much shade as possible. During these shiftings on the nest to avoid the sunshine, she sometimes assumed peculiar and awkward positions. On one occasion the tail was caught on a projection above the nest and as she turned, it remained in position until the tail and wing were crossed in an extremely grotesque fashion.

During the morning of July 7, the bird left the nest only once for a period of eleven minutes (8.59 to 9.10 a.m.), but during the afternoon of July 10 she left five times for periods ranging from 9 to 17 minutes, with an average of 15. The greater number in the afternoon was probably due in part to the apparent discomfort from the excessive heat, indicated by much shifting of position, panting, rising in the nest and shuffling of the wings. What the bird did on these occasions while off the nest was difficult to determine. On several occasions, she could not be followed. However, on two occasions, an adult bird catching insects strengthened our inference that she was off after food at least part of the time.

When leaving the nest, in nearly every case she flew southeast across an open space at a height of about four to six feet above the ground and disappeared between the trees (below the main bulge of the branches) about fifty yards distant. Upon returning, she nearly always appeared in an approach tree about ten yards west of the nest tree, but occasionally used other approach trees. After lingering from a few seconds to a few minutes, she usually flew to a dry limb in the top of the nest tree where she lingered for a similar period of time. Dropping down into the foliage, she became lost to sight and usually appeared at the nest limb in one or two minutes and went directly to the nest. She hopped up on the side and down into the nest immediately. We watched particularly to see if she consciously turned the eggs, but on no occasion did she put her bill down into the nest. She did, however, on nearly every entrance into the nest, stand there apparently shuffling her feet several times as if arranging them in a comfortable position, undoubtedly moving the eggs in doing so. Whether it was an intentional attempt to move the eggs, we were unable to determine, but by watching the position of the black dots on the eggs, we were able to determine that the eggs were being continually changed in position.

When the nest was visited at 8.15 on the morning of July 18, the bird was found sitting on the east side of the nest shading the nest cavity where the eggs were hatching. The nest contained one young

bird with its sparse down not yet dry, one egg pipped on its upper surface a score or more times and one egg just starting to pip. The eggs laid on three different days were hatching almost simultaneously about fourteen days after the last one was laid. There were no shell fragments of the hatched egg in the nest.

We did not visit the nest again until a week later, July 25, when the nest was watched all morning from 8.00 to 12.00. Our last visit was made on July 29, but in our absence after that date Professor Charles D. Winning, Field Director of the expedition, and Blaine Cutler, cook, very kindly visited the nest daily from July 30 to August 4 and watched the debut of the fledglings.

When the nestlings were a week old (July 25), they were about one-third grown and the new feathers bearing the sparse down on their tips were conspicuous on wings and backs. The young were large enough to consume considerable quantities of food and kept the parents busy gathering food most of the time. During the four hours of observation, the young were fed 30 times, an average of eight minutes between food-bringing visits to the nest and an average of ten feedings per nestling. This means that each young bird was fed on an average once every twenty-four minutes.

The periods between feedings were by no means regular. They varied in length from one to twenty-eight minutes and were shorter and much more regular in the early morning than toward noon. After ten o'clock there were four periods of fifteen to twenty-eight minutes, during which an adult bird was usually observed at the nest or perched nearby a good deal of the time, probably either resting or protecting the young birds from sunshine. The duration of the shorter periods (one to nine minutes) appeared to depend largely upon the success of the adult birds in catching insects. On one occasion, an adult bird that had just fed the young caught another insect immediately and was back in one minute.

So far as we could tell, the food consisted entirely of insects. It varied in size from tiny beetles to a butterfly so large that the young could scarcely take it, and included such recognizable forms as grasshopper, yellow wasp, moth, and ant-lion.

Both parents seemed to take part in the feeding despite the solitary incubation of the female. We watched carefully to determine this point. On several occasions, two adult birds were seen in the vicinity of the nest, and on two separate occasions, while one bird was feeding the young at nest, the other bird was seen approaching with food in the bill and was watched as it brought the food to the nest. This



point received additional corroboration when another nest containing three fledglings was found on July 16 and both parents were on hand around the nest.

Once only, the parent bird was observed to carry away a fecal sac of the nestlings from the nest (11.29 a.m., July 25). Once while incubating, the adult bird was observed to raise the rump and defecate over the edge of the nest (5.40 p.m., July 16). The nest, after it was deserted, was fairly clean.

High temperature from spots of sunshine on the nest disturbed the nestlings as it did the incubating adult. On several occasions they were observed to be panting and exhibited restlessness whenever the sunshine was directly upon them. Two or three times the parent sat on the edge of the nest as much as fifteen to twenty-five minutes sheltering the young ones from the sun, and once the female was observed standing in the nest among them with partly outspread wings giving them protection.

The behavior in approaching and leaving the nest seemed to indicate a definite characteristic pattern, which was usually followed both in incubation and in feeding, although in the latter case with so many visits to make it was somewhat varied. The incubating bird, when leaving the nest, without any previous indication, suddenly stepped upon the edge of the nest and flew low over the ground through the open space directly away from the nesting tree to the southeast. This same route was often followed when leaving the nest after feeding, but sometimes the bird deviated in the open space and turned in various directions. Occasionally other routes away from the tree were followed.

In returning to the nest the birds nearly always used an approach tree for a temporary perch, as in incubation, before coming to the nest tree, although on one or two occasions, an adult bird was observed to come directly to the nest tree first. Any one of the surrounding trees might be used as the approach in feeding, whereas the one to the west was nearly always used in incubation. Otherwise, the procedure in approach was quite similar except that in feeding, it was often quicker and sometimes more direct. We thought we detected more carelessness during the last days of feeding when parents were so harassed by food calls.

The size of the nesting territory was not accurately determined but the adult birds hunting insects were often seen within fifty to one hundred yards of the nest tree. So far as observed, we did not find any neighbors to interfere with their spreading out as far as desired.

After leaving the nest the family undoubtedly wandered much more widely.

On two occasions, other birds were observed in the nest tree. On July 17, at 5.41 p.m., the day before the eggs hatched, as the adult bird was returning to the nest and was perched in the top of the tree, a Gray Titmouse, *Baeolophus inornatus griseus*, flew into the tree and began hunting up and down the limbs. The flycatcher shifted position so that both the titmouse and the human observer were in sight, perched a minute or two, and then went on its usual course down through the foliage to the nest limb where it immediately entered the nest leaving the titmouse hunting through the foliage. When the young birds were a week old, an adult Baird's Wren, *Thryomanes bewicki eremophilus*, approached within two feet of the nest where the adult flycatcher was tending the young. The wren was driven a few feet farther away but allowed to remain in the nest tree, while the flycatcher perched about six feet from the nest.

So far as we could determine, there seemed to be three distinct songs or notes used by the adult birds in addition to the chipping food calls of the nestlings. The song of the adult male usually consisted of two syllables with the accent on the second and with some variation of the first. This may be rendered in English as approaching *tu-weet*, *tu-sweet*, or *ts-weet*, with a high musical quality. By contrast, the song of the Hellmayr's Flycatcher, *Empidonax difficilis hellmayri*, of the heads of the higher canyons in Transition or Canadian Zones, may be rendered as *per'tee* or *per'-ty*, with a similar musical quality but with the accent on the first syllable.

A second note of the Gray Flycatcher, usually heard in incubation both when the adult bird was on and when it was off the nest, consisted of a single syllable very similar to the song but much shorter. It may be rendered as *tseet*. The third note was a simple *prit* made by the adult bird (female?) from the rim of the nest after feeding the young at 11.32 a.m., July 25. The call was repeated several times. In doing so, the bill was scarcely opened at all, but a little patch of throat feathers was puffed out slightly each time.

The reaction to human intruders around the nest seemed to have a definite characteristic pattern, consisting of a feigned weakness or listlessness which did not appear to be as emphatic as 'injury.' During incubation the reaction was exhibited several times to different observers, and was repeated during the nestling stage. The incubating bird did not seem to be disturbed by people passing within a few feet and usually did not even turn the head to watch as they passed.

The bird usually remained undisturbed when a person standing within three feet of the nest put out his hand until it was within a foot of the bird, when it flushed. It then flopped to the ground a few feet from the observer simulating weakness with wings drooping and head low. Here the pattern varied a little. If the intruder started to follow, the bird hopped or flew weakly a short distance ahead, gradually faster and farther in advance until far enough away, when it flew off among the trees. On two occasions when the intruder did not attempt to follow, the bird, after flopping to the ground and getting no response to the weakness feigning, actually turned around and came back nearly to the feet of the observer and tried a second time to attract his attention. While the eleven-day-old nestlings were being inspected on July 29 and one of them had been lifted from the nest, an adult bird appeared, flew to a branch near the observer, flopped to the ground about four feet distant feigning weakness and attempted to lead the observer away from the nest as already described.

The down plumage at the time of hatching was very scanty, consisting mainly of a sparse sprinkling along the sides of the crown and on the scapular and dorsal tracts. It was replaced rapidly by the pin-feathers. The eyes were closed at hatching, but by the age of seven days, on July 25, were capable of being opened as a narrow slit. The young birds were very well feathered and grown by July 29, their eleventh day, and we were surprised that they remained in the nest so long afterward. The plumage in which they left the nest was the very distinctive pale-gray back with clear white belly and tail with white outer webs to the lateral feathers that make the young of this species unmistakable at a glance in the field.

#### SUMMARY

1. The Gray Flycatcher, *Empidonax wrighti*, is a fairly common summer resident and breeder in the pygmy-conifer forest of north-eastern Arizona and southeastern Utah.

2. Two broods appear to be the rule, each requiring about seven weeks and leaving the nest approximately in late June and in early August, respectively.

3. Observations on two nests indicate that they are made chiefly of juniper bark with other lining material and placed in juniper trees.

4. Observations on a single nest indicate that the female lays three immaculate white eggs on successive days; that one parent incubates alone for fourteen days; and that both parents feed the young in the nest for sixteen days.

5. Numerous observations indicate that parents feed the young outside the nest for several days, estimated at two weeks.

6. During incubation and nestling care the parent birds exhibit a primitive type of weakness or 'injury-feigning' behavior.

7. The down plumage at time of hatching consists mainly of a sparse sprinkling along the sides of the crown and on the dorsal and scapular tracts. It is rapidly replaced by pin-feathers and the fledglings are well feathered at eleven days.

#### LITERATURE CITED

BAILEY, F. M.

1928. Birds of New Mexico. New Mexico Dept. of Game and Fish, 807 pp.

BAIRD, S. F., CASSIN, J., AND LAWRENCE, G. N.

1858. Birds. In Repts. of Explorations and Surveys . . . for a Railroad from the Mississippi River to the Pacific Ocean, 9 (pt. 2): ix-lvi, 1-1005, atlas.

BREWSTER, WILLIAM

1889. Descriptions of supposed new birds from western North America and Mexico. Auk, 6: 85-98.

DAWSON, W. L.

1923. The birds of California. South Moulton Co., four vols.

GRINNELL, JOSEPH

1908. The biota of the San Bernardino Mountains. Univ. California Publ. Zool., 5: 1-170.

1915. A distributional list of the birds of California. Pacific Coast Avifauna, no. 11: 1-217.

LINSDALE, J. M.

1936. The birds of Nevada. Pacific Coast Avifauna, no. 23: 1-145.

PHILLIPS, A. R.

1939. The type of *Empidonax wrightii* Baird. Auk, 56: 311-312.

WILLETT, GEORGE

1912. Birds of the Pacific Slope of southern California. Pacific Coast Avifauna, no. 7: 1-122.

3395 Scranton Road

Cleveland, Ohio

and

University of Utah

Salt Lake City, Utah

## NOTES ON MACGILLIVRAY'S SEASIDE SPARROW

BY IVAN R. TOMKINS

## Plates 2, 3

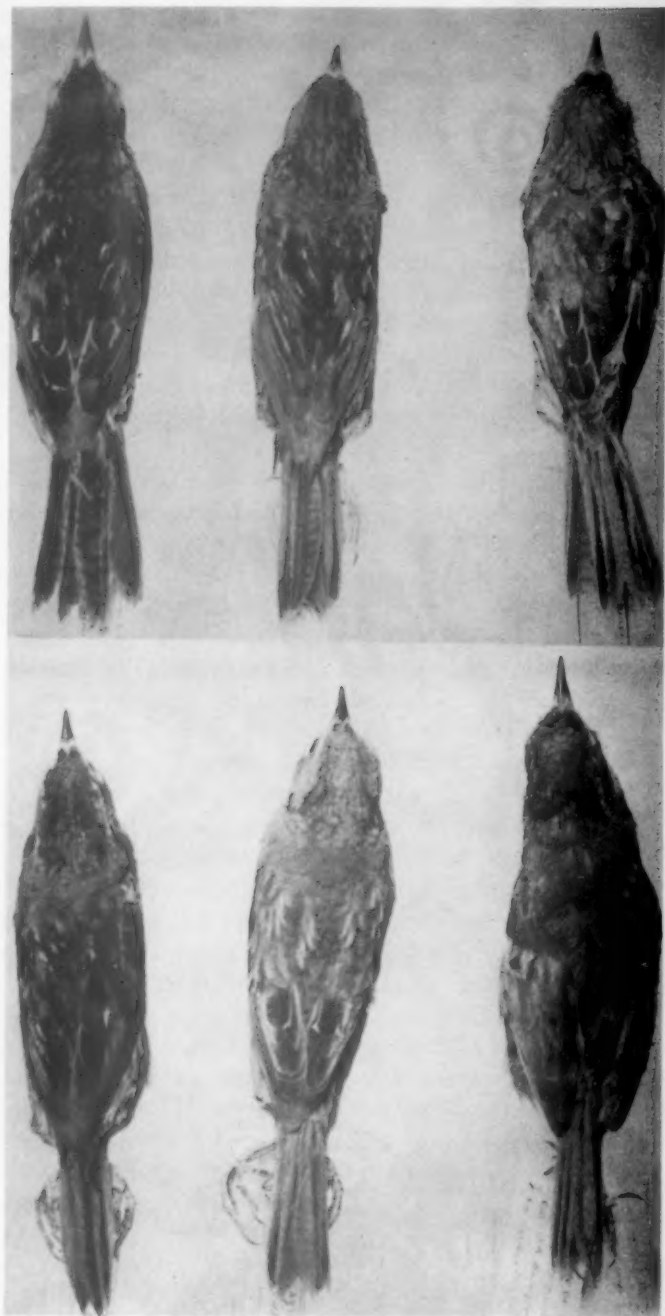
THE genus *Ammospiza* of the current A.O.U. 'Check-list,' including the several species and subspecies of the Seaside Sparrows, and the three subspecies of Sharp-tailed Sparrows, seems to be founded nearly as well on habitat as on taxonomic characters, for all of these birds live in wet marshes. The Seaside Sparrows live in the salt marshes of the Atlantic and Gulf coasts, while the Sharp-tailed Sparrows are somewhat more northerly in breeding range, and one subspecies, Nelson's Sparrow (*A. caudacuta nelsoni*), breeds in a strictly fresh-water habitat in the interior of the continent. All of the genus favor salt marshes in winter. The evidence of a common ancestry is strong, and in the field there are many resemblances in behavior. The great variation in color has brought the Seaside group to the attention of systematists, and many species and subspecies have been named. The differences do not seem very stable; they do not appear to be easily connected with density of cover, nor do they progress geographically in any regular manner, as is the case in some of the other Fringillidae.

According to the A. O. U. 'Check-list' there are three species, one of which has been divided into seven subspecies, making nine different forms to consider. The darkest (*A. nigrescens*) is found on the east coast of Florida, and the lightest (*A. mirabilis*) lives—or did live until recently—in the area about Cape Sable, close to the southern tip of Florida. The seven subspecies of *A. maritima* are spread from southern New England along the coast to Texas, and dark and light forms are distributed in a rather haphazard fashion. There are also differences of color in the same local group. Since the publication of the last 'Check-list' in 1931, the description of other subspecies of *A. maritima* threatens further complication of the situation.

Probably these erratically distributed color forms are at least partly mutational and brought out from a varied genetic makeup, assisted of course, by conditions incident to the habitat. Perhaps these changes are actively in process now, rather than fixed, comparatively speaking, from earlier times.

The questions of mixing, of homing in spring, of advances and recessions in range (possibly due to fluctuations in numbers) over a period of years, all tie in with the solution of the phylogeny or the lineal descent and differentiation of the group. The effect of tropical hurricanes on such a bird can only be theorized on so far, but they





SEASIDE SPARROWS (SEE EXPLANATION OF PLATE)

v

n

b

s

b

t

t

s

t

i

c

P

U

a

s

u

a

i

a

m

l

a

f

i

c

u

might affect the range of some of the subspecies in such a way that, over a period of years, our present system of identifying breeding birds by type locality would not be true identification at all. Where such variations occur, one cannot but wonder if those patterns of behavior we call 'territory holding' and kindred habits, are stable throughout the group, and the same in all parts of the range. At first thought, it would seem that these patterns are fundamental, and not subject to very much variation. They seem to be a product of what the bird is, times its habitat throughout the period it has occupied that habitat. Yet we do know that some birds are quite different in habits in different parts of the range. Conceivably, a change in certain behavior patterns might prevent the mixing of two stocks, and produce a division into two species, as the word 'species' is commonly used.

This account of the Seaside Sparrow relates mostly to one small area and hence is based entirely on observations of one subspecies so far as breeding behavior is concerned. It contains much theory yet unproven, and leaves many loose ends untied; but an honest attempt at interpretation, with some record of the things on which it is based, is more desirable than none at all; and no attempt is made to establish a complete set of behavior scales. Previous accounts in the literature refer mostly to systematic position, and but a few brief notes touch on life-history matters.

Wherever in this account, the terms 'dark form' and 'light form' are used, it must not be considered that these are more than expressions used to give simple meaning to certain wide divergences. Actually, there are many colors and combinations of colors in the Seaside group, colors which are not constant throughout the local group. Generally in this paper, the term 'dark form' is intended to give meaning to the dark-backed type of bird which has been known so long as *macgillivrayi*, and to distinguish it from the lighter-backed birds living in the same areas with it, as well as on northward to New England, and southward through South Carolina and Georgia.

This subject has been somewhat touched upon elsewhere (Tomkins, 1937), but a certain amount of repetition is necessary to make the present paper clear. An understanding of the tangled history and confused relationships is necessary, in order to give a basis for consideration of life-history matters.

#### HISTORY

The breeding Seaside Sparrow of the South Carolina and Georgia coast is currently known as Macgillivray's Seaside Sparrow (*Amospiza maritima macgillivrayi*).

Gilbert R. Rossignol found it nesting on Cabbage Island, Chatham County, Georgia, on May 10, 1907, for the first time in this local area. [Cabbage Island is a low salt-marsh island just north of Wassaw (or Warsaw) Sound, and about eight miles south of the Savannah River entrance.] Seaside Sparrows were found nesting at St. Marys, Camden County, Georgia—at the southern edge of the State—in 1877 by William Brewster (1890), and in 1904 Arnow (1906) collected two birds and a nest. Except these, there seem to be no records of nesting Seaside Sparrows on the coast of Georgia before Rossignol's discovery, nor on the coast of South Carolina, at least as far north as Charleston, from the time of Audubon (who did not certainly state that the bird he described as Macgillivray's Finch was a local breeder), until 1924, when Chamberlain and Sprunt (Sprunt, 1924) found a nesting colony a few miles south of that city. Wayne, who spent a fruitful life a few miles north of Charleston, never found the species nesting there. I am sure that Wayne did not get very close to any Seaside colony, or his keen ear would have picked up the song, and he would have investigated further.

After Rossignol found the birds nesting on Cabbage Island, he had much correspondence with Wayne who, believing this to be typical *maritima* or a new race, reiterated many times in his letters to Rossignol: "This is not *macgillivrayi* no matter *who* may say it is." In Wayne's collection are a number of specimens very dark on the back, fulfilling his conception of *macgillivrayi*, but all of these were migrants at Mount Pleasant and vicinity, where he collected them.

The origin of the conception of *macgillivrayi* as a dark-backed bird was with Chapman (1899). For a long time this name had been regarded as synonymous with *maritima*, until Chapman called attention to the fact that there were Seaside Sparrows to be found along the South Atlantic coast, which were neither *maritima*, *fisheri* nor *peninsulae*. A juvenal specimen in the U. S. National Museum was believed to be Audubon's type of *macgillivrayi*. This bird was much darker than typical juvenals of *maritima*, so was easily connected with the unnamed dark birds. At that time there were no recent breeding specimens from South Carolina, as far as the literature tells us, so this was regarded as representing the local race of that State.

It is quite possible that Audubon described his species (*macgillivrayi*) from a migrant. But type localities make quite enough trouble without being transplanted on such a supposition. Again, in Audubon's time, the dark form may have bred in the Charleston area. Certainly none of them has been found recently in the local breeding colonies.

When Rossignol collected a series which was not like these dark birds, Wayne thought for a time that here was a new race similar to the northern *maritima*, yet separated from it by the dark birds which bred in some unknown place north of Mount Pleasant. He intended to name it for Rossignol, as is plain from the letters he wrote to Rossignol, but he apparently abandoned the idea of naming a new race. I have the impression that he corresponded with other prominent ornithologists of that day, and began to realize that the information available was far too incomplete.

It may be that Wayne read Dr. Louis B. Bishop's letter to Rossignol, dated May 30, 1916, in which he wrote, "Breeding on Pea Island, North Carolina, there are two types of coloration, one with the dark centers to the feathers, and generally very dark, which corresponds with Mr. Wayne's *macgillivrayi* specimen. The other is much like your birds [i. e. the Cabbage Island specimens], but darker, having the yellowish wash to the plumage and no black centers to the pattern above. This color phase I have taken on Pea Island in winter, but not the dark phase. Possibly your birds may be the same as this yellowish phase of *macgillivrayi*, many specimens of which are hard to distinguish from Connecticut birds. The strange thing is, if this is so, that apparently only this phase breeds in Georgia. Add to this complication the fact that breeding birds from Texas are dark—very dark—while winter birds are pale and green, and Mr. Wayne has just lent me a bird he took at Mt. Pleasant in April (?) (I write from memory) which is indistinguishable from birds breeding in Texas." In Dr. Bishop's collection are a number of the dark-backed birds, which he collected on Pea Island, North Carolina. These agree with Wayne's conception of *macgillivrayi*, and are definitely distinct from the Georgia birds and those breeding at Charleston.

Then Oberholser (1931) described a new subspecies, naming it *waynei*. One of Rossignol's specimens was designated the type, and the type locality was given as Chatham County, Georgia. He also states that specimens of this form had usually been identified as *macgillivrayi*, "but even a superficial comparison suffices to show that they are not the same." He seems not to have discovered that the breeding birds of the Charleston area and Cabbage Island are very nearly, if not quite, identical, when in satisfactory series, and much different from the dark-backed birds which for a long time had been called *macgillivrayi*.

Two things about Oberholser's *waynei* deserve attention here. The type locality can be specified in greater detail by adding "Cabbage



Island" to "Chatham County, Georgia." Second, the whereabouts of the type specimen should be a matter of record. According to information furnished the Charleston Museum in 1934, the type is still in Dr. Oberholser's private collection.

Because the Cabbage Island birds and those from Charleston are indistinguishable, and because the type locality of *macgillivrayi* was fixed as Charleston by Audubon's original description, that name must be used instead of *waynei*. This of course is based on the supposition that the South Carolina and Georgia birds are distinguishable from *maritima*, which is by no means proved yet.

This leaves the dark bird from North Carolina nameless, and the matter might be simply settled by designating a name for it, if it were a constant color form, but much of the evidence now available indicates that it is but a mutational form with all manner of intergradations between it and the lighter form that breeds throughout the same area.

#### LOCALE

The coast of Georgia and South Carolina is edged with barrier islands, fronting on the ocean, and behind them are hundreds of miles of salt and brackish rivers winding between other islands that are low and mostly composed of the silt that has been deposited in the lagoons back of the barrier islands. Of the area covered by these flat marshy islands, a large portion may be flooded at times with a few inches of water, when the cumulation of spring tide and northeast wind raises the normal high-water level. Through the islands meander many creeks, often heading in salt ponds well back in the center of the salt-marsh meadows. It is in turn the extra-high tides that furnish the scavenging effect necessary to keep the salt-marsh creeks open for the normal ingress and egress of the tides.

The dominant plant of the wet creek edges and much of the wetter marsh is *Spartina alterniflora* Loisel. In the wide salt-marsh meadows this is sometimes displaced by large areas of black rush (*Juncus roemerianus* Scheele). In parts a little drier there are grasses that are but half-knee high, resembling Bermuda grass, but mostly an associates of *Paspalum vaginatum* Swartz, and *Sporobolus virginicus* (L.) Kunth. In drier parts there are large stands, sometimes ten feet high, of *Spartina cynosuroides*. Farther back is the groundsel tree (*Baccharis halimifolia*) which in turn gives way to the bayberry (*Myrica*) and other vegetation of the sandhills and dunes.

On most of these marsh islands there is a small hammock or so, with palmettos or pines, and there is often a small line of dunes or an



MACGILLIVRAY'S SEASIDE SPARROW IN CHARACTERISTIC POSES

o  
f  
t  
o  
o  
v  
R  
o  
A  
n  
f  
b  
fr  
h  
o

oystershell ridge at the soundward side of the islands bordering on the inlets. On such low islands as these is the domain of the Seaside Sparrow. Not on all of any island, nor on all the islands, but in certain parts of many of them.

The area I know best, and where most of the observations have been made, is within a few miles of the Savannah River, northward into South Carolina and southward into Georgia. Besides this area, some attention has been given to Seaside Sparrow habitat in Glynn County, Georgia, during the spring seasons of 1930 and 1938. A few visits were made to nesting colonies of this species on Amelia Island, Nassau County, and in the marshes north of the St. John's River, Florida. Though the last two places show plainly the changes attendant on less tidal range, the bird's habitat and habits showed no departure from those observed in the Savannah area.

#### HABITAT AND NESTING

Of the many things necessary to provide suitable habitat, but two are plainly enough marked to be set down here. First, an adequate feeding ground is necessary, and second, suitable nesting cover must be had within easy flight of the feeding grounds.

Many, perhaps most, of the Fringillidae (the sparrows, towhees, etc.) find these two major requirements of habitat implanted on each other or mixed together in the same area. Under such conditions has developed the now well-known territory-holding behavior, of some generality among the group, though not as yet well charted for other than a few species.

The Seaside Sparrows of this locality often live where the two requirements are not always together or even meeting, but also where the feeding grounds and the nesting place are separated by a short distance. This way of living is of importance, and has introduced differences of behavior which will be set down later on.

For several years my experience with the species in nesting season was in the wide flat salt-marsh meadows where there was ample nest protection close to the desired feeding grounds. But in May 1933, on a trip to Cabbage Island, in the company of Gilbert Rossignol, Arthur H. Howell and Thomas D. Burleigh, we found the birds nesting in the head-high tops of the groundsel trees (*Baccharis halimifolia*) that rimmed the sand-shell ridge back of the outer beach. The birds did not feed near the nests at all, but commuted back and forth from the nest locality to the wet banks of the salt creeks some two hundred yards back in the island. After the significance of this mode of life began to be plain, some puzzling things were clarified.

Mr. S. A. Grimes has told me of his experiences with Scott's Seaside Sparrow (*A. m. peninsulae*). He found them nesting along a narrow ridge or low dike in bushes, and flying out into the marsh to feed. Though he made photographs from a blind, he noticed no appearance of territorial jealousy, and in one place found two nests a measured six feet apart. The reason for such a division of habitat is the flowing of the desired feeding grounds by the tides, making them unsuitable for nesting purposes.

The food requirements are far stronger than nesting needs in determining habitat limitations. For nests may be built in many different situations, may be composed of such material as is at hand, and vary from eight inches above the marsh mud in *Sporobolus-Paspalum* to three feet in *Spartina* or *Juncus*, and up to five feet in *Baccharis*. But because suitable food is not nearby, these birds have not been found nesting beyond commuting distance from the wet banks of the salt creeks (where *S. alterniflora* grows ranker), the ponds that head the creeks in the salt meadows, and the grass patches (*S. alterniflora*) of the outer beaches that are flowed by each tide.

In a number of places under observation over several seasons, changes of terrain due to the erosion of tides and storm, have brought coincident shifting of the Seaside Sparrow populations according to the feeding-ground limitations outlined above.

The preference is for some fairly thick grass in which to build nests. Granted sufficient density of cover, the preference probably runs in a *Sporobolus/Paspalum*-*S. alterniflora*-*Juncus*-*Baccharis* order. It will be noticed that this is in order of height of the nest host, from lowest to highest. Nests are not built in shrubbery unless other suitably protective plants are not near and of sufficient height to be above the tides.

Another point is that the nests are top-entrance nests, rather than the ground-entrance nests such as that of the Clapper Rail. In *Juncus* the nests are in the tangled mass of rushes far enough below the top to allow good cover, but not deeper. In *Baccharis* the chosen site is just below the thick leaves of the top, and not lower among the bare branches.

The nests are built of the softer grass blades of the vicinity, and when not covered by the natural foliage, are canopied. This canopy was more nearly complete where there were heavily incubated sets of eggs, so probably it is added to as incubation progresses. The growing grasses are woven into the canopy if available. Those nests naturally sheltered by the foliage in the tops of *Baccharis* are without canopy.



None but females have been found showing incubation patches, and some things seem to indicate a partial dissociation of the sexes during incubation, but it is extremely difficult to observe well the life of a species that spends so much of its time below decks, so to speak, in the thick cover it inhabits. The birds pop up at the least disturbance to see what it is all about, the males do their singing well out in sight, and both sexes come out into the open to fly directly to some desired point, yet much of their time is spent either directly on the marsh mud, or in the lower part of the grasses over it.

Other things hampering studies of this species are the heat, the hordes of flies and mosquitoes, and the remoteness of the colonies. No one need go to a Seaside Sparrow colony as I have known them, from April on through August, without expecting to be bitten by thousands of mosquitoes and flies. A stay of two hours to a visit has usually proved to be my own limit.

The nesting season here is very long. Incomplete sets of eggs have been found in late April, and young birds partly fledged have been seen in late August. The greatest number of nests have been found in June and nearly as many in May, but not so many visits have been made in July and August. The natural supposition would be that two or more broods are raised each year. Mr. S. A. Grimes has told me of finding a number of nests with eggs all in about the same stage of incubation, twice or more in a season, indicating that more than one brood has been raised. But lacking further proof, it is uncertain that this is always the case with a long nesting season. With favorable conditions of food and temperature over a long portion of the year, and with a species whose comparatively short migrations indicate that it has nearly optimum conditions for year-round residence, the long-drawn-out nesting season might be expected to approach that of some of the resident tropical species. Much more could be postulated about the effects of this on variation, but present knowledge does not warrant such speculation. It may be said, however, that the more stable New England *A. maritima* has a more sharply limited breeding season.

#### TERRITORY

My observations all point to a lack of territorial jealousy in the species. Territory is here considered to mean a behavior involving a nesting and feeding area, which is defended by one or both parents against others of their own, or of a highly competitive, species.

"Territory cannot mean just the nest spot when the adults feed in common; this may be 'nest territory,' but it is a very different

matter from a territory in its strict sense to which parents confine themselves during the breeding season. Again, the very essence of a territory lies in its exclusiveness; if a bird's range is not defended, it is not a territory" (Nice, 1933).

It seems that Seaside Sparrows do feed in common, sometimes in pairs, sometimes singly, just prior to the egg-laying time, and most probably at other times also. I have seen five pairs in a sparse patch of *Juncus* some fifty feet across, and could follow their course underneath by the notes, yet failed to notice any particular disagreement. Careful search failed to reveal any nests in this patch, but there were several about one hundred yards away, in the *Sporobolus-Paspalum*.

Neither does the song appear to be a declaration warning other birds away. The singing is done from a grass stalk well out in sight, and it is usual to see a bird leave its perch, fly a couple of hundred yards away over other singing males, there to alight and resume song. The singing is done close by the nest location and also on the feeding grounds. On one occasion two birds sang about fifty feet apart. There was no appearance of competition about it, and the songs were timed quite independently of each other. Then one bird went below in the grass, and after a minute the other flew over, perched nearby, sang for a minute, then went below too, and there was no evidence of other than tolerance for each other. Sometimes a bird is halfheartedly chased by another as it flies over, but there is no determination in it.

The flight song has been described by others, but it is noted that the singing bird, after towering into the air, often does not return to the point from which the song started (and which might be regarded as a focal point of territory), but drops down nearly to the grass tops, then levels off for a point some distance away.

It is not to be expected that colony-nesting birds have a territory in the strict sense, and the Seaside Sparrows have developed a semi-colonial nesting habit with feeding grounds within commuting distance, as described under 'Habitat,' where enough food is available so that no jealousy is necessary. This seems a good explanation for the lack of territory holding.

It would seem that territory as a basic pattern, may have developed where considerable numbers of the same (or a competitive) species struggled for individual survival, which in this particular direction centered on food for the nesting pair and their young progeny for a time. If this be true, then a parallel species which did not develop

such a pattern, may not have found a necessity for food jealousy during the nesting season, because their numbers were kept below the crowding point by lack of increase due to some destructive factor or factors. Or it might be, as in the present habitat, that conditions did not allow defense of the nesting and feeding ground, due to the distance between them. There are many destructive factors that might have prevented crowding, either by a periodical reduction or by a fairly constant effect. Storms that recur at intervals, possibly at nesting time, might be one. Disease or parasites might work in combination with other lethal factors. Certainly today the available habitat (if I have interpreted habitat needs correctly) is far from filled, yet we know of more colonies and more birds than ever before.

The Turtle Island colony (Beaufort County, South Carolina) contained from five to twenty-five pairs, over the last few years. On Jones Island (also in Beaufort County) one could walk around a circle one half-mile in radius and see two hundred birds at times; yet many miles of terrain that appeared equally favorable, contained very few (if any) birds. If lack of crowding has been the cause for lack of territory behavior, the condition must have continued for a long time.

Another bit of logical conjecture is whether territory holding was once established and is now decadent, or if the species (possibly all of the genus *Ammospiza*) never has developed such behavior. If there is a latent territory pattern now decadent in the species, then present habitat conditions must have come about after the territory pattern had developed. (In other words, former habitat conditions caused or favored the development of a territory pattern; these habitat conditions changed to those of the present time, and the pattern was no longer operative or needed.) On the other hand we might consider that present habitat conditions (plus a long-time lack of numbers) have been prevalent so long that a territory pattern never developed at all.

Let us suppose that a long time ago, the species already possessed a well-developed territory defense. Then changing conditions, of food perhaps, placed it in a range where the feeding grounds, though ample, were covered by tides each day so that nesting on them was impossible. But nearby a sheltered cover, limited in extent, offered suitable nesting protection above the tidal reach. Under such conditions might not the most strictly territorial of species develop a nesting tolerance, and find it impossible to guard the food areas as well as the nest vicinity? Today some of the range I know ap-

proaches such conditions. Under such a colonial nesting scheme, what part does song play in the life of the Seaside Sparrow? In Texas, where the mean tidal range is not much over one foot, does the same breeding behavior obtain, as in the Savannah River marshes, with a range of seven to ten feet?

Dr. C. W. Townsend, as quoted by Forbush (1929) gives a hint of similar grouping among the Sharp-tailed Sparrows: "The birds appear distinctly social. In some localities several pairs are often found breeding together, while other localities, apparently equally favorable, are deserted." Is it possible that the Sharp-tailed, as well as the Seaside Sparrows, developed their social behavior in lands subject to tidal overflow, and that Nelson's Sparrow (*A. c. nelsoni*) is quite a newcomer, comparatively speaking, to the more even water level of the inland marshes? The need of adequate local studies is apparent.

#### MIGRATION

The puzzling relationships have complicated the migration records greatly, and until more definite information is available as to what the birds from this locality look like in fresh plumage, and whether and how they differ from *A. maritima*, we may logically doubt many identifications of wintering birds; for certainly if the breeding birds are so little known, then the winter change of plumage, which is well known to be a long-drawn-out affair, may add extra doubts.

It is certain that the local colonies in the Savannah area, begin to be peopled with singing birds by late March, and the first wave appears to be all of males. A week or so later, there are females among them.

From these colonies in the salt-marsh meadows well back from the outer beaches, there is a withdrawal of juvenals as soon as they are fledged, and late August finds very few adults remaining. Probably some of these withdraw only a few miles to the places where *S. alterniflora* grows at its very best, and begins to flower. Juvenals have been found here in the striped plumage until November, but there is no certainty that these are local birds, for Wayne found many migrants in the striped plumage passing through Mount Pleasant, from August on through the autumn.

One juvenal taken near Savannah on August 31, 1933, and apparently stormblown about five miles west of the usual migration band, is very dark-backed, and agrees with the Wayne specimens of *macgillivrayi* in that plumage. It must have come from the North Carolina coast, and had migrated several hundred miles when only a short time out of the nest. This, incidentally, is the only speci-

men I have found so far inland, in spite of a careful watch for them. The main migration band follows fairly closely the summer-habitat width.

Now Dr. Bishop (see letter previously quoted) says that he did not find the dark birds on Pea Island in winter, but that he did take the light (yellowish) phase. To me this can be explained only on the ground that the birds he took in winter were in reality not the same as the light breeding birds, but that they must have been wintering birds from farther north. In other words, this means that apparently no distinction could be made between the wintering birds and the light birds resident on the island in the breeding season. Surely one would not expect the dark breeding birds to leave Pea Island in the winter (along with the intermediates), and the light ones to stay. Perhaps *macgillivrayi* should have been left in synonymy with *maritima*. Part way down the South Carolina coast, Wayne found the dark birds from late July on through the fall, winter and spring, but he found none at all in the breeding season. In my own series, are a few skins approaching the dark form, being much too blackish on the back for any of the local birds north to Charleston at least, and most of them were taken in October.

There are a few old records of *peninsulae* (= *macgillivrayi*) from Sapelo Island, midway of the coast of Georgia, in winter (Allen, 1888: 426; and Brewster, 1890: 212). At that time *macgillivrayi* was considered synonymous with *maritima*, and the range of *peninsulae* (itself a dark bird) was not yet understood to be on the west coast of Florida. Probably these winter records were correct, and the birds were migrants from the North Carolina coast. But a very similar bird (a breeding specimen) was collected some twenty years or more ago, on Amelia Island, at the northern edge of Florida, along with some other breeding birds of the light form.

After the Allen and Brewster records, the great storm of August 1893, destroyed many things all up and down the coast of Georgia and the Carolinas. For some years after that, there were very few records of nesting Seaside Sparrows from much of the area covered by the storm. Who knows what stock inhabited this area before the storm, and before other storms (there are records of several over the same area), or where the dividing line (vague even now) marked the extension of the dark form? Winter records of *macgillivrayi* on the Gulf coast may well be in error.

The Wayne journals, now deposited in the Charleston Museum,



are full of interesting, if brief, comment on these birds. He often writes, "very dark," "intergrade," "with back very curious," "not typical," etc. Many of the specimens to which he referred are in his collection, and doubtless most of the others are in collections elsewhere over this country.

Since this paper was written, my attention has been called to a paper by Donald J. Nicholson, 'Nesting habits of the Seaside Sparrows in Florida' (Wilson Bull., 40: 225-237, 1928). Nicholson's paper is interesting and informative, and confirms rather than disproves the general conception of Macgillivray's Sparrow which I have tried to picture here.

#### ACKNOWLEDGMENTS

Mr. E. Burnham Chamberlain, Curator of the Science Department of the Charleston Museum, has twice critically read this paper, and has given much assistance otherwise. Mr. Don Eyles gave the botanical determinations; Mr. Gilbert R. Rossignol loaned correspondence with Wayne and others, and allowed access to his egg records; Dr. Louis Bishop loaned birdskins and gave permission to quote his letter to Rossignol, written some twenty-odd years ago; and Mr. S. A. Grimes read the manuscript and gave advice and notes from his experience with several races of Seaside Sparrows in Florida.

To all of these, my heartiest thanks are due. The conclusions here, however, are my own.

#### LITERATURE CITED

ALLEN, J. A.

1888. Further notes on Seaside Sparrows. Auk, 5: 426.

ARNOW, ISAAC F.

1906. The Seaside Sparrow nesting in bushes. Auk, 23: 226.

BREWSTER, WILLIAM

1890. The Acadian Sharp-tailed Sparrow and Scott's Seaside Sparrow on the coast of South Carolina. Auk, 7: 212.

CHAPMAN, FRANK M.

1899. The distribution and relationships of *Ammodramus maritimus* and its allies. Auk, 16: 1-12, pl. 1.

FORBUSH, EDWARD HOWE

1929. Birds of Massachusetts, etc., Boston, vol. 3: 63.

NICE, MARGARET MORSE

1933. The theory of territorialism and its development. Fifty Years' Progress of Amer. Ornith., 1883-1933, publ. by Amer. Ornith. Union, pp. 89-100.

OBERHOLSER, HARRY CHURCH

1931. The Atlantic Coast races of *Thryospiza maritima* (Wilson). Proc. Biol. Soc. Washington, 44: 123-128.

SPRUNT, ALEXANDER, JR.

1924. Breeding of Macgillivray's Seaside Sparrow in South Carolina. *Auk*, 41: 482-484.

TOMPKINS, IVAN R.

1937. The status of Macgillivray's Seaside Sparrow. *Auk*, 54: 185-188.

#### EXPLANATION OF PLATES

##### PLATE 2

Dorsal views of skins of Seaside Sparrows.

UPPER ROW (left to right): Dusky Seaside Sparrow (*Ammospiza nigrescens*); Wayne's specimen of *Passerherbulus maritimus fisheri*; Cape Sable Seaside Sparrow (*Ammospiza mirabilis*).

LOWER ROW (left to right): Wayne's conception of *Passerherbulus* (= *Ammospiza*) *maritimus macgillivrayi*; Wayne's conception of *Passerherbulus* (= *Ammospiza*) *maritimus maritimus*, a migrant in fresh plumage that compares well with typical New England birds; a Seaside Sparrow from Cabbage Island, Georgia, type locality of *Thryospiza maritima waynei*, an authentic breeding bird in worn breeding plumage collected by Gilbert R. Rossignol.

##### PLATE 3

Macgillivray's Seaside Sparrow (*Ammospiza maritima macgillivrayi*) in typical habitat. Upper and lower-right figures show characteristic singing poses.

U. S. Dredge DeWitt Clinton  
Savannah, Georgia

## FEEDING OF NESTLING BANK SWALLOWS

BY DAYTON STONER AND LILLIAN C. STONER

In a recent paper entitled 'Observations on Sand-martins at the Nest' (British Birds, 33: 95-97, 1939) R. E. and W. M. Moreau record the number of feedings brought to nests carrying young of this species, *Riparia r. riparia*, at Farnham, Surrey, England. The appearance of these data prompts us to set forth the results of our own similar observations on this bird near Albany, New York, in the summer of 1933.

The Bank Swallow colony which we investigated was located in a roadside sandy cut with an eastern exposure about seven miles west of Albany. A well-traveled paved highway lay at a distance of about one hundred feet from the bank. The section of bank occupied by the nesting swallows was about twelve feet high and fifteen feet in length. Twenty-one burrows had been excavated by the birds but of these four had been deserted or at least were unoccupied at the time of our first visit on June 11. On this and subsequent visits twenty-two adults from thirteen burrows were banded. The feeding records here reported upon were obtained from the adults carrying food to young in eight of the burrows which we marked with small white tags to facilitate their ready identification. Our view of the proceedings was had both with the unaided eye and with binoculars from an enclosed motor car parked at the edge of the highway not more than ninety feet from the burrow entrances. During the observation periods we remained as motionless as possible and after the first few moments following our arrival, the swallows apparently gave no heed to the parked car and its occupants, so intent were they on their domestic activities.

Our first counts of the birds' food-carrying trips were made on the evening of June 29. Upon our arrival at 8.20 p. m. we noted that the adults were still feeding young. At the nest indicated as 'No. 1' in the accompanying table which carries our records for the following day, eight feedings occurred between 8.27 and 9.27 p. m. As a matter of fact all the feedings were administered before 9 p. m. By this time it was almost dark and activity in the colony had practically ceased. Examination of the interior of the burrows by flashlight between 9 and 9.30 p. m. indicated that brooding by the adults occurred only in those nests containing very small young.

At 8.45 a. m. on June 30, we returned to the Bank Swallow colony and parked our car at the side of the highway opposite the cut. Al-

though we actually began our watching at 9 a. m., we permitted a little time for the birds to become accustomed to the presence of the automobile before recording the formal counts which include the periods 9.35 a. m. to 12.35 p. m., 2 p. m. to 5 p. m., and 6.25 p. m. to 7.25 p. m. (Eastern Daylight-saving Time). These represent a total of seven hours for the day. The weather was clear and calm; maximum temperature 89 degrees, Fahr., minimum 72 degrees.

A condensed summary of our observations is presented in the accompanying table which shows the principal data obtained with the exception of the length of the feeding intervals. In order to permit of more ready analysis the observation time has been divided into hourly periods. Of special interest are the figures showing the way in which the 958 feeding visits of the parent birds were distributed among the seven hours of watching.

COUNTS OF FEEDINGS BROUGHT TO BANK SWALLOW NESTS IN  
COLONY AT ALBANY, NEW YORK. JUNE 30, 1933

| Nest<br>No. | No.<br>young<br>in<br>nest | Estimated<br>age of<br>young<br>in days | A. M.          |                 | P. M.           |               |               |               |               | Totals |
|-------------|----------------------------|---|----------------|-----------------|-----------------|---------------|---------------|---------------|---------------|--------|
|             |                            |   | 9.35-<br>10.35 | 10.35-<br>11.35 | 11.35-<br>12.35 | 2.00-<br>3.00 | 3.00-<br>4.00 | 4.00-<br>5.00 | 6.25-<br>7.25 |        |
| 1           | 3                          | 10-12                                   | 17             | 15              | 18              | 22            | 25            | 18            | 13            | 128    |
| 2           | ?                          | 5-9                                     | 24             | 32              | 28              | 20            | 23            | 30            | 13            | 170    |
| 3           | ?                          | 5-9                                     | 12             | 9               | 10              | 10            | 13            | 8             | 3             | 65     |
| 4           | 4                          | 5-9                                     | 28             | 33              | 21              | 17            | 18            | 25            | 11            | 153    |
| 5           | 3                          | 5-9                                     | 12             | 21              | 28              | 29            | 27            | 30            | 12            | 159    |
| 6           | 2+                         | 2-4                                     | 13             | 15              | 12              | 18            | 16            | 10            | 15            | 99     |
| 7           | 5                          | 2-4                                     | 8              | 8               | 10              | 9             | 8             | 7             | 6             | 56     |
| 8           | 4                          | 5-9                                     | 15             | 17              | 14              | 25            | 24            | 16            | 17            | 128    |
| Totals      |                            |   | 129            | 150             | 141             | 150           | 154           | 144           | 90            | 958    |

It will be noted that in the fifty-six separate observation hours distributed among the eight nests, the number of feedings was usually between ten and twenty-five. In nine of the one-hour periods the number exceeded twenty-five while in a like number of periods these visits occurred less than ten times. For the entire observation period on the eight nests the number of feedings administered to the young averaged 17.1 per nest per hour. This rate is considerably less than that indicated by the Moreaus who report (*loc. cit.*, p. 96) that "in 24 separate hours, distributed between the four nests, the number of feeds brought was nearly always between 25 and 43." On the other hand, our figures are considerably higher than those given by Beyer

(Wilson Bull., 50: 122-137, 1938) in the Sodus Bay, New York, region where in a single fifteen-hour period for two thirteen-day-old birds, food was delivered on an average of a little more than eight times an hour.

For the swallows that came under our observation at Albany the feeding rate was fairly regular throughout the day although it was highest between 10.30 a. m. and 5 p. m. As the afternoon waned and evening came on, a rather marked slackening of effort on the part of the adults occurred. This was particularly noticeable from 6.30 p. m. However, a few visits by the adults with food were noted as late as 9 p. m. Although the Moreaus' observations on this point are well in line with our own, those of Beyer are somewhat at variance with those cited, for he reports (*loc. cit.*, p. 133) that "during the period from 5:00 p. m. to 7:00 p. m. feeding occurred more often. . . . But after 7:00 p. m. no more visits were made by the parents that day."

In connection with the discussion of feeding rate a brief analysis of the correlated data which we obtained on the intervals between feedings will be appropriate. Our figures show that for the 958 feedings, 335 of the between-feeding intervals lasted less than two minutes and of these 136 lasted less than one minute; on the other hand, 320 intervals lasted more than three minutes and of these 146 lasted more than five minutes. The remaining intervals fell in the 2- to 3-minute group. It is evident from this that the feeding visits exhibited some departure from the frequency and regularity noted by the Moreaus who report that for the 726 feedings which they recorded "more than half of the intervals lasted less than two minutes." However, it should be borne in mind that one one-hour set of our records was obtained between 6.25 p. m. and 7.25 p. m. while the Moreaus' recordings ceased at 6 p. m. In view of the slackening of late-afternoon feeding effort noted by them and by ourselves, some allowance should be credited for this circumstance in our figures.

All the available evidence seems to indicate that the number and rate of delivery of feedings by adult Bank Swallows to their young as well as the lateness of the hour at which they are delivered are subject to considerable variation. Perhaps these factors are associated, in some degree at least, with local conditions and circumstances.

A few relevant notes setting forth certain supplementary items associated with our records on the feeding activities of this bird are appended.

Both parent birds sometimes entered the burrow with food at approximately the same time. Under such circumstances one of the



adults left within a few seconds; the other followed after a longer interval and usually carried a pellet of excrement.

The adult swallows coursed about over the nearby fields and woodlots in search of food and, so far as we could determine, their feeding territory did not, for the most part, extend over one-half mile from the nesting site. This parallels our earlier Oneida Lake observations (Stoner, *Roosevelt Wild Life Annals*, 4: 126-233, 1936).

Several of the adult swallows had their own individual methods of approach to the nests. Certain birds on returning from a food-gathering sortie habitually flew directly into the burrow without any preliminary circling or other aerial maneuvers; others hovered before the burrow a moment before delivering food to the young within. At no time, so far as we could tell, did the adults enter the burrows save to deliver food or carry away excrement; and seldom did they enter the burrows exclusively for the latter purpose for removal of fecal sacs usually was accomplished on the same visit that food was delivered.

On the day of our observations a marked lull in the feeding activities of the adults occurred between 12.15 p. m. and 12.40 p. m. During this interval the swallows hovered and glided slowly about the burrow entrances but few actually entered the burrows. Indeed, between 12.15 and 12.21 no birds entered any of the burrows. There were no evidences of fright or excitement among them as the swallows continued to mill about in the air before the burrow entrances. Sometimes they alighted on the sand at the base of the bank and fluttered in it briefly; often they appeared to pick up sand grains in the bill.

*New York State Museum*

*Albany, New York*

*and*

*399 State Street*

*Albany, New York*

## 'COURTSHIP FEEDING IN BIRDS'

## 'COURTSHIP FEEDING'—A CORRECTION, AND FURTHER RECORDS

IN my paper on courtship feeding in birds (Auk, 57: 169-178, 1940) I was mistaken in including the presentation of snow by the Adélie Penguin (*Pygoscelis adeliae*), which was based on observations of Murray Levick. Mr. Brian Roberts recently made an intensive study of the behavior of this species when he was a member of the British Graham Land Expedition (in press). He informs me that pebbles, which form the nest lining, are presented in courtship and that when snow is presented, this is as a substitute for such pebbles, and has nothing to do with the male feeding the female.

The newly published fourth volume of the 'Handbook of British Birds' (1940, ed. H. F. Witherby) includes two more records. T. A. Coward saw a male Fulmar (*Fulmarus glacialis*) eject oil into the mouth of a female, and D. Nethersole-Thompson a male Slavonian Grebe (*Podiceps auritus*) bring a fish to a female at nest relief. These seem the only records for the petrels and grebes, respectively. Also included is a second record of this habit in the Stone Curlew (*Burhinus oedipnemos*), which is apparently the only charadriiform bird with the habit. Mr. Nethersole-Thompson writes me of two further unpublished observations, namely, in the Falconiformes the habit occurs in *Falco subbuteo* not only during incubation but also prior to laying; and in the Motacillidae, courtship feeding is regular in the Meadow Pipit (*Anthus pratensis*) during incubation.—DAVID LACK, Dartington Hall, Totnes, England.

## 'COURTSHIP FEEDING' IN VARIOUS BIRDS

ON a recent trip to New York I found in the American Museum of Natural History two articles which give theories as to the function of the feeding of the female by the male that are not mentioned in David Lack's article in the April 1940 number of 'The Auk.' H. Wachs (Verh. d. Deutsch. Zool. Ges. e. V. Zool. Anz., Suppl., 6: 192-202, 1933) considered that in the case of gulls and terns the food itself had a definite function in supplying the female with extra nourishment for egg laying. G. Steinbacher (Ber. Verein Schles. Ornith., 23: 42-64, 1938) doubted this theory, as there was little courtship feeding with his gulls in the zoo, yet the same number of eggs was laid as in the wild. (However, food is certainly more easily obtained in such a situation than in Nature.) He believes that this feeding has nothing to do with the formation of the pair, and suggests that it may be a premature appearance of the instinct to feed young, and the male is the chief provider for the newly hatched chicks.

For the Order Ciconiiformes the habit of 'courtship feeding' is stated by Lack to be "absent," but in a recent note by G. K. Yeates (British Birds, 34: 98-99, 1940) there is a reference to male feeding female in the case of the European Bittern (*Botaurus s. stellaris*).

In Lack's list there was no example of males feeding females among the Hirundinidae; I have found two reports of its occurrence during incubation in the Tree Swallow, *Iridoprocne bicolor* (J. A. Cash, Bird-lore, 35: 201-205, 1933; Weydemeyer, W., Bird-lore, 36: 100-105, 1934).

Finally this habit is recorded for *Troglodytes rufociliatus* in the recent article by Skutch (Auk, 57: 308, 1940), making the first instance for the wrens.—MARGARET M. NICE, 5708 Kenwood Avenue, Chicago, Illinois.

SOME ADDITIONS TO THE LIST OF DAVID LACK

PARIDAE (Titmice). CAROLINA CHICKADEE, *Penthestes carolinensis carolinensis*.—From 'Bird Banding Brevities' (The Migrant, 9: 51, 1938): "On a limb above the feeding shelf, the orange-plumed individual was seen posturing like a begging juvenile with quivering wings while the red-plumed male fed her." This occurred in April 1938. I do not know if nesting had started as the nest was not found.

TUFTED TITMOUSE, *Baeolophus bicolor*.—On March 21, 1940, hearing unfamiliar shrill, sibilant calls, I went to the window to see the source. A Tufted Titmouse perched on the rim of the feeding shelf with quivering body and wings, was giving the call as some food was held in the beak. My sudden appearance caused the bird to fly and I was unable to find out if a companion was near but this behavior undoubtedly occurred as a part of courtship because this year nesting was not started at that date.

TROGLODYTIDAE (Wrens). BEWICK'S WREN, *Thryomanes bewicki bewicki*.—Some years ago when a pair of Bewick's Wrens nested in a gourd on our porch, the male brought food many times a day to the brooding female on the nest. Each time he arrived at the porch, he perched several feet from the nest and announced his arrival with a song before flying to the gourd. In Lack's list 'courtship feeding' is given as "apparently absent" in the Troglodytidae.—AMELIA R. LASKEY, Graybar Lane, Nashville, Tennessee.

ADDITIONAL CASES OF 'COURTSHIP FEEDING'

The following recorded instances of courtship feeding extend the list recently published by Mr. David Lack, and may be called to mind here.

EASTERN BELTED KINGFISHER, *Megaceryle alcyon alcyon*.—In his latest volume of 'Life Histories' (Bull. U. S. Nat. Mus., no. 176: 112, 115, 1940), A. C. Bent reports on his own authority and quoting Bendire, that the male feeds the female while she is incubating.

BALTIMORE ORIOLE, *Icterus galbula*.—In her book entitled 'Bird Ways' (Chapter 8, p. 120, 1885), Olive Thorne Miller writes: "An oriole that I watched in the Catskill Mountains regularly fed his mate while she was sitting."

AMERICAN PIPIT, *Anthus spinoletta rubescens*.—William Gross in his paper on 'Home-life of the American Pipit' (Bird-lore, 34: 309-314, 1932) reports regular feeding of the female by the male during incubation and brooding of the young.

LARK SPARROW (*Chondestes grammacus*).—An observation made in the case of this species (probably of the typical race, since it occurred in Michigan), was reported by Dr. Frank N. Wilson (Bird-lore, 33: 108-110, 1931), who states that the male feeds the female while she is brooding nestlings.—HERVEY BRACKBILL, 3201 Carlisle Avenue, Baltimore, Maryland.

COURTSHIP OF THE ROADRUNNER

(Contribution from the Archbold Expeditions of the American Museum of Natural History)

On March 31, 1940, near Tucson, Arizona, I saw the mating ceremony of a pair of Roadrunners (*Geococcyx californianus*). They were about fifty yards from their nest which contained three eggs, as it did when I found it on March 28, and in which three more eggs were subsequently laid. When I first saw the pair the male was standing with a lizard dangling from his bill. The female, about three feet distant, was turned away from the male. She was crouched low to the earth and

was fluttering her wings. After a few moments of this, the male ran to the female, mounted her and copulation ensued, the male not seizing hold of the female with his bill but retaining the lizard in his bill. Copulation completed, the male stepped from the back of the female. As he did so the female turned her head, took the lizard from the bill of the male and swallowed it. The male, with head outstretched, ran rapidly three times around the female and then away. This display was seen only once.

This type of courtship display has apparently not been previously recorded for this species, though it occurs in some other cuckoos, and many other distantly related species of birds (see Lack, Auk, 57: 169-178, 1940).

The Roadrunner ceremony consisted of: *pre-copulation* (1) the posing of the male with the lizard, (2) the invitation of the female, (3) copulation; *post-copulation* (4) the passing of food from male to female, (5) the circling of the female by the male.

Some of these acts used in the Roadrunner's display have a real use in the reproductive cycle which follows, but appear here out of place as a formalized display; all the acts of the complex series, with the exception of copulation itself, are found in the life of the bird at other times.

To consider them in order. The posing of the male with a lizard is a very common, almost characteristic action of these birds at any time. The killing of a lizard with the bill alone, as the Roadrunners do it, frequently takes time, and the bird often stands or runs with the lizard in its bill during the killing. Also, when young are being fed, lizards are being continually carried. This act, used as part of the courtship procedure, is perhaps a premature, useless, stereotyped appearance of an act which later becomes of essential service in raising the brood.

The invitation of the female, with fluttering wings, suggests the actions of the young in begging for food. (I could not see the details of the female's head to see if she was holding her bill open for food.) Here is the use of an act which is brought over from infancy and which also suggests the actions of the young to come. In the young bird there is a physical need which can be satisfied only by the co-operation of another individual and this need is conveyed to that individual by 'begging.' Or the 'begging' is the releaser which sets off the corresponding response in the parent bird. The wing fluttering of the female in her invitation to copulation also serves to secure the cooperation of another bird.

There are, however, two other acts of Roadrunners which are also somewhat similar to this invitation of the female. One is dust bathing, in which the bird squats on its breast, and by shuffling its feet and fluttering its wings, forces dust into its ventral feathers. In the crouching, the invitation of the female resembles the dusting position. The dusting, however, is performed when the bird is at rest and at ease.

Another type of activity in which wing fluttering is used is in injury feigning. In the twenty to thirty times that I flushed an incubating or brooding bird from its nest, only once did the bird feign injury. It then darted to the ground from its nest, ran some distance to a shrub, crouched on its breast and fluttered its wings. Several times it did this, ran a few yards and repeated this before finally running away. Friedmann (Psychoanalytic Review, p. 11, 1934) has postulated injury feigning as a conflict between two drives; to me it seems a specific type of action given under certain conditions. In any event it is given when the bird is much excited.

Here we have modification of a similar type of act used in four quite different

ways under four different sets of circumstances, when the bird is quite differently excited, and serving different purposes. Perhaps there is a paucity of ways in which the bird can react, due to physical equipment.

The actual copulation is the only act peculiar to this ceremony. The post-copulation act of the male passing food to the female finds its counterpart in the act of the adult feeding the young. This is another case where an act which later has an essential use in the reproductive cycle appears early, before it has any real use, as do many instinctive acts. Here, however, the act becomes part of a formalized ceremony which initiates a cycle in which the act plays an essential rôle. The final post-copulation part of the ceremony, the rapid circling of the female by the male, recalls the dashing about of an excited bird. Young birds which I have raised by hand frequently dashed about in various directions in their cages for no obvious reason, apparently as a release for surplus nervous energy that could be assuaged only by rapid motion. Perhaps the motivation of the mating bird is similar.

SUMMARY.—Here we have a series of acts used in sequence to give a complex ceremony, which has its climax, though not its end, in copulation. The act of copulation which is necessary to give meaning to the ceremony is the only part of the ceremony which is peculiar to it. All the other components of the ceremony are also used under other circumstances, for other purposes. The Roadrunner has not evolved new types of acts for its sexual display, as have some birds, but has used acts already in existence. Some of these acts in other connections have definite significance, in infancy, in raising the young, and in assuaging excess nervous energy. These, together with a single peculiar act, are bound together into a complex conventionalized ceremony with a special use.—A. L. RAND, *American Museum of Natural History, New York City.*

#### INCUBATION FEEDING OF CALLIOPE HUMMINGBIRD

DAVID LACK, in his timely and interesting summary article 'Courtship Feeding in Birds,' which appeared in the April issue of 'The Auk' (57: 169-178, 1940) records many examples of courtship, incubation and other feeding of birds and suggests that any additional information be submitted. In his classified list of bird orders (page 176) he says that in the Micropodiformes (swifts and hummingbirds) this courtship- or incubation-feeding habit is "apparently absent" and on page 175 he states that "in the order Pelecaniformes feeding of adult birds is found only in the Tropic-birds."

It seems appropriate, therefore, to report that in the summer of 1923, while attending the Alpine Summer School (of Brigham Young University), on Mount Timpanogos of the Wasatch Mountains, Utah, my wife and I had the good fortune of placing our tent near the nest of a Calliope Hummingbird (*Stellula calliope*) which was on a maple bough overhanging a cool mountain stream at about 7,800 feet elevation. Incubation had already started when we discovered the nest. The male bird on a number of occasions was observed to feed the incubating female by regurgitation. Both the male Calliope and Broad-tailed Hummingbirds (*Selasphorus platycercus*) were seen feeding on oozing maple sap from holes that had been recently drilled by a Red-naped Sapsucker.

As evidence that the Tropic-birds feed other adults, Lack (page 172) refers to Murphy's report of finding among breeding island colonies an adult *Fregata magnificens* and a four-year-old Booby (*Sula leucogaster*), both in excellent flesh but



each with only one wing. Both birds obviously were unable to capture their own food.

Equally convincing evidence that the food-begging behavior of the young is sometimes retained and successfully used by old White Pelicans is contained in Captain Howard Stansbury's entertaining diary (*Exploration and Survey of the Valley of the Great Salt Lake of Utah, etc.*, Philadelphia, 487 pp., 1852). Under date of May 30, 1850, at Gunnison Island (page 193) in Great Salt Lake, Captain Stansbury writes that while rambling about the shores of the island he came across an old White Pelican that was very large and fat but stone blind. As the bird was totally helpless, it must have "subsisted on the charity of its neighbors and his slick and comfortable condition showed that, like beggars in more civilized communities, he had fared sumptuously every day." Stansbury points out that inasmuch as the nearest possible source of food was not less than thirty miles distant, it necessitated at least a sixty-mile trip daily to feed this helpless bird. Unfortunately no description of the method of feeding is reported.—CLARENCE COTTAM, *U. S. Biological Survey, Washington, D. C.*

## WING SKELETON AND FLIGHT OF HAWKS

BY WILLIAM L. ENGELS

SOME years ago Hans Böker (1927) attempted to show that each type of flight exhibited by birds is accompanied by a particular and precise pattern of proportions within the wing skeleton; and further, that the phylogenetic development of the flight types could be analyzed by comparative anatomical and ontogenetic study of these patterns. This pioneering work in an essentially new field of ornithological research (*biologische Anatomie*) seems not to have gained, outside of Germany, the recognition it deserves, perhaps due in some measure to a strongly Lamarckian flavor in its presentation. More recently Böker (1935) has elaborated his original schema and definitions of types.

In evaluating Böker's data, two questions arise. First, since he had at his disposal, at most, scanty material for each form, can one be certain that the proportions as illustrated by him are truly representative of the species concerned? Second, are the differences in proportion between types based on functional differences or are they primarily phylogenetic in origin?

With regard to the first question I have recently shown (Engels, 1938a), in a statistical study of a large series of Coot skeletons, that the variability of those proportions on which Böker chiefly relies (intramembral proportions) is usually less than 3% (standard deviation less than 3% of mean). Comparable results (Engels, 1940) were obtained in a previous study on thrashers (*Toxostoma*). In these statistical studies on proportions one encounters striking examples of individual constancy to type such as the following. In thirty-six specimens of Palmer's Curve-billed Thrasher (*Toxostoma curvirostre palmeri*), the humerus averaged but slightly shorter than the femur (98.8%) in length; in only four of the thirty-six individuals was the humerus longer than the femur (up to a maximum of 101.5% of femur). In twenty-one specimens of Bendire's Thrasher (*Toxostoma bendirei*) the humerus averaged only slightly longer than the femur (101.7%) and in none of the individuals was the humerus shorter than the femur. Here, then is a case of two related species—remarkably difficult to distinguish from each other in the field—in each of which the humerus and the femur are approximately equal in length, with a slight average difference favoring in one the humerus, in the other the femur; yet the overlap of individual variation is so slight that almost any pair of individuals

taken at random will exhibit the essential difference. These examples are of *intermembral* proportions, chosen because they happen conveniently to deal with bones of very nearly equal length; but it has been shown (Engels, 1938a) that correlation in length of parts is even closer *intramembrally* (e.g., within the wing) than it is *intermembrally* (i.e., between wing and leg).

These studies have led me to the very general and, I believe, reasonable conclusion that a few specimens, even single specimens, will suffice to reveal strongly contrasting patterns of proportion; but that large series of individuals and statistical treatment are necessary to demonstrate the reliability of slight differences. Thus, the patterns shown by Böker (1927) in his original presentation do depict, with sufficient reliability, the major differences in the wing-skeletal proportions of the five forms illustrating his five major flight types (*Perdix*, *Corvus*, *Apus*, *Megalornis* and *Diomedea*). Contrarily, no great reliance can be placed on his later figures (Böker, 1935), showing subtypes, transitional types, and modified types, where the differences between adjacent forms are very slight (unless one confine his attention to the general picture of change, ignoring the individual forms).

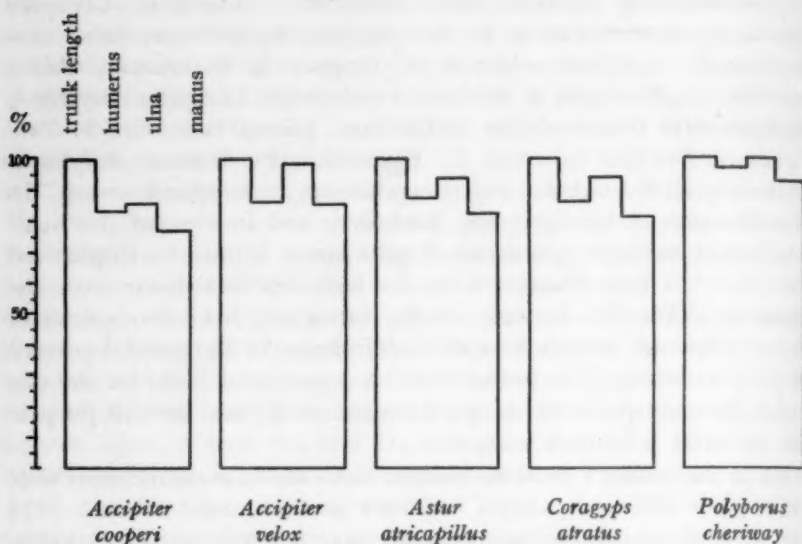
Now, as to the second question, whether differences in proportions have, primarily, a functional or a phylogenetic basis, it seems best to make our analyses in closely knit phylogenetic groups. I have already demonstrated (Engels, 1940), on a statistical basis, that the several species of *Toxostoma* exhibit varying patterns of proportion, and that the interspecific differences within this genus can be explained on a basis of functional correlation. Again (Engels, 1938b), I showed that differences in the patterns of proportion in the wing skeleton seen in three genera of cuculiform birds accompany functional differences. In each of these two instances, however, we are dealing not with differences in *mode* of flight so much as with progressive loss of flight ability or tendency to flight as a means of locomotion, that is, with a reduction or regressive evolutionary phenomenon. These previously determined correlations of structure and habit, then, had to do with loss of function, or diminished function, of the wing, rather than with changes of function in active modes of flight. Therefore it seems worth while to record the results of a similar study on some North American falconiforms—a natural group whose members sometimes display striking dissimilarities in flight habits. The data for this study were obtained from skeletons in the California Museum of Vertebrate Zoology with the kind permission of the Director, the late Dr. Joseph Grinnell.

The following skeletons were available. Cathartidae: *Coragyps atratus*, 1; *Cathartes aura*, 4. Accipitridae: Accipitrinae: *Astur atricapillus*, 1; *Accipiter velox*, 9; *A. cooperi*, 3; Buteoninae: *Buteo borealis*, 15; *B. regalis*, 2; *Parabuteo unicinctus*, 1; *Aquila chrysaetos*, 4; *Haliaeetus leucocephalus*, 1; Circinae: *Circus hudsonius*, 8; Pandioninae: *Pandion haliaetus*, 3. Falconidae: Polyborinae: *Polyborus cheriway*, 2; Falconinae: *Falco mexicanus*, 2; *F. sparverius*, 4. In consideration of the foregoing discussion, and in view of the small number of available specimens of most forms, it must be emphasized that the data here illustrated are not sufficient to indicate truly the probable differences between similar forms (e.g., the two species of *Falco*); they are intended to show differences in the general pattern of proportions (e.g., as between the two species of *Falco* on the one hand, the two species of *Accipiter* on the other) and for this purpose the material is entirely adequate.

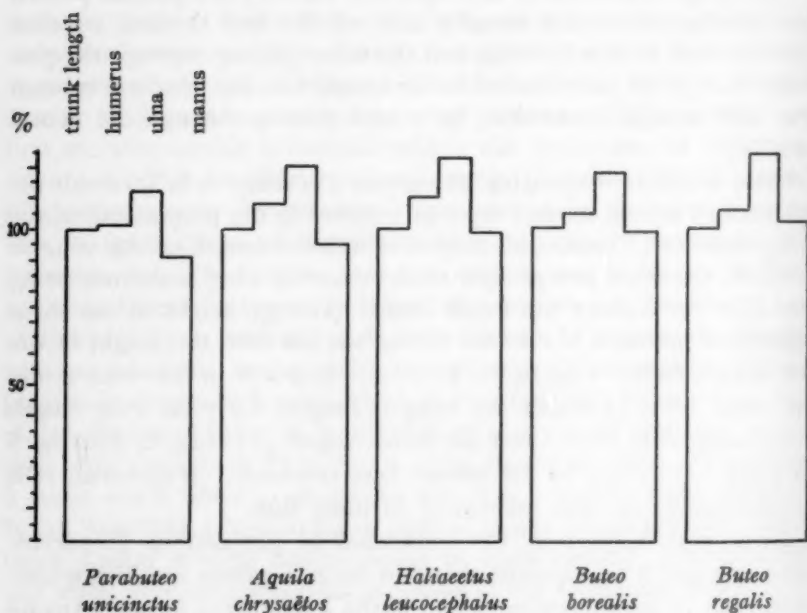
As in the author's previous studies, cited above, measurements were made with dial-type calipers and read to the nearest 0.1 mm. For the wing elements, the measurements were taken across the articulating surfaces; length of manus is the sum of three measurements: of the carpometacarpus and of each phalanx of the second (longest) digit. Trunk length was taken as a straight line between two parallel planes, one passing across the anterior face of the last cervical vertebra (last vertebra with a free rib) and the other passing through the posterior face of the last vertebra in the synsacrum; the vertebral column was held straight meanwhile by a stick passing through the neural canal.

Study of the accompanying histograms (Text-figs. 1, 2, 3) reveals the presence of several distinct types or patterns in the proportions of the wing skeletons. First, with respect to relative length of the wing as a whole, there are two groups; in the one, the wing is shorter, being less than three times the trunk length (average height of the three right-hand columns of any one histogram less than the height of the left-hand column; Text-fig. 1, Text-fig. 3 in part); in the other group are those birds in which the wing is longer, the total wing length being more than three times the trunk length (Text-fig. 2, Text-fig. 3 in part). Only one of the species here considered (*Polyborus*) falls approximately on that (arbitrary) dividing line.

Next, with respect to the intramembral proportions (humerus: ulna: manus) it is apparent that two further groups are distinguishable, both in the short-winged and in the long-winged forms. Among the short-winged forms are some in which the ulna is the longest seg-

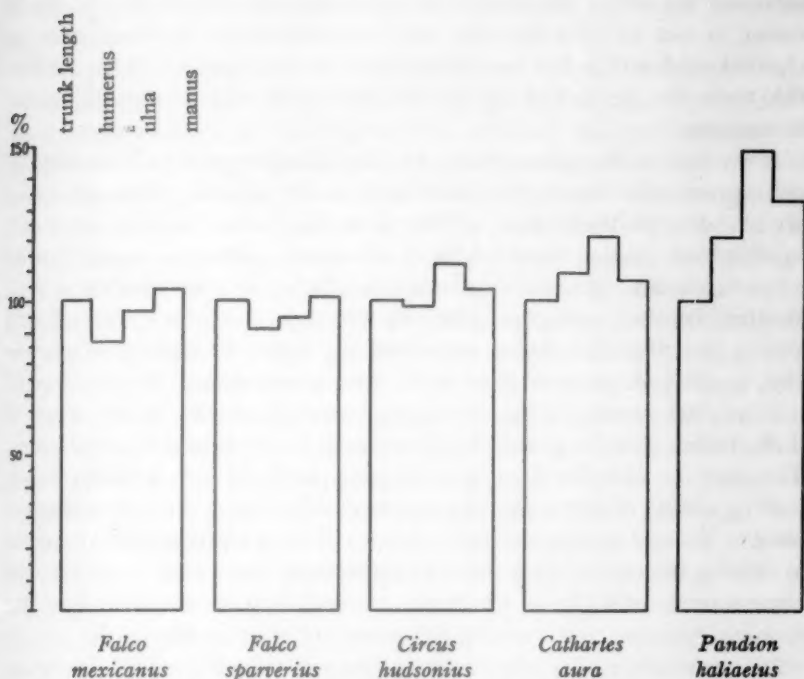


TEXT-FIG. 1.—Skeletal ratios in hawks.



TEXT-FIG. 2.—Skeletal ratios in hawks.





TEXT-FIG. 3.—Skeletal ratios in hawks.

ment, the manus the shortest (Text-fig. 1: *Accipiter*, *Astur*, *Coragyps*); and others in which the manus is the longest segment (Text-fig. 3: *Falco*). Some of the long-winged forms are like the first-mentioned short-winged group, with shorter manus and longer ulna (Text-fig. 2: buteonines; Text-fig. 3: *Cathartes*); but others present a third pattern of intramembral proportions, in that the manus is intermediate in length between the longer ulna and the shorter humerus (Text-fig. 3: *Circus*; *Pandion*).

These patterns are summarized in the following scheme:

*A*—short-winged

- a) manus < humerus < ulna
- b) humerus < ulna < manus

*B*—long-winged

- a') manus < humerus < ulna
- c) humerus < manus < ulna

It is immediately striking that these several patterns are not distributed strictly in accordance with the accepted phylogenetic inter-

relationships of the forms here being considered. The falconid, *Polyborus*, is not at all *Falco*-like, but is intermediate between two accipitrid subfamilies, the buteonines and the accipitrines. One cathartid, *Coragyps*, resembles the accipitrines; while *Cathartes* is like the buteonines.

If we seek a functional basis for this morphogenetic similarity of phylogenetically dissimilar forms, some order appears, although there are manifest contradictions. The buteonines, which indulge in much soaring and circling on set wings and which otherwise appear somewhat heavy and slow in their flapping flight, are all similar to one another in their wing proportions (Group *B* — *a'* of the scheme above; Text-fig. 2). Some other soaring types fit into this scheme also, notably *Cathartes*. But while the intramembral proportions of still another soaring type, *Coragyps*, are similar, the whole wing is short, rather than long and therefore much like that of the accipitrines. This may be correlated, at least in part, with the very evident lesser soaring ability of *Coragyps*, as compared with *Cathartes*; but *Coragyps* must still be characterized as a soarer. The accipitrines are capable of soaring flight, but their short wings seem to be related to their more normal mode of flight, in which are stressed deep wing-strokes, and the dashing, twisting and turning in pursuit of prey in the bush.

It seems clear that the various proportion-patterns of the wing skeleton are at least as closely correlated with function as with family. But in some instances (here notably *Coragyps*) the functional correlation appears to be unsatisfactory. This is probably because numerous factors other than wing-skeletal proportions are operative in determining flight type. The wing skeleton and the proportions of its segments determine the basic leverage system of the wing, that is, they constitute the basic mechanical factors. In addition, two other sorts of factors, aerodynamic and psychobiological, are concerned; these depend indirectly on the mechanics of the wing skeleton.

One of the chief aerodynamic factors involved is the aspect ratio of the wing expanse, determined largely by the relative length of the flight feathers borne by the hand (primaries) and by the forearm (secondaries), but also determined in part by the length of the wing skeleton, both of the wing as a whole, and relative length of manus and ulna. The shape and position of the flight feathers (especially primaries) is also significant, whether broad and overlapping to their tips to form a completely air-resistant surface, or narrow and separated distally. Still other aerodynamic factors include the plane of the wing surface, the flight expanse and shape of the tail, the absolute

body size (weight) and the relative body size (relation to wing expanse).

The psychobiological factors are more subtle, but we cannot doubt their existence. The position of the wings in soaring, whether held in a horizontal plane (buteonines) or uptilted (*Cathartes*), may be of this sort, as well as the angulation of the wing (*Pandion*) and the spreading or folding of the tail-feathers in flight. Obviously psychobiological are the factors which determine preferential behavior in the air. Thus, the soaring sometimes indulged in by species of *Accipiter*, and said to be especially frequent in migration flights, indicates that they are fully capable of such flight, although their usual flight is of an entirely different nature. The courtship aëronautics of *Circus* may be contrasted similarly with its normal hunting flight.

Such factors are superimposed on the proportion-pattern of the wing skeleton and modify its functional significance. All factors, including skeletal proportions, represent the present stage in a continuous evolution. This introduces an historical (phylogenetic) factor. With respect to the skeletal proportions, the pattern seen in the accipitrines is probably near the generalized ancestral falconiform condition. Such generalized wing-skeleton proportions permit diversity of flight habit (in large birds); the type of flight actually performed depends in part on the psychobiological factors involved in preferential behavior, and, more especially, on modifications in the flight feathers (as well as absolute body size). These latter, aërodynamic, structural adaptations probably precede, in evolutionary time, those adaptive modifications of the skeleton involved in alteration of skeletal proportions. Thus, in *Coragyps*, the wing skeleton, although lengthened somewhat, retains the generalized intramembral proportions, but the flight feathers have been modified to give the broad wing characteristic of birds soaring on thermal air currents. The more thoroughly specialized soarers show not only the aërodynamic adaptations of great wing expanse (feathers!), but also a more greatly lengthened wing skeleton, with the hand especially increasing in relative length.

The falcons contrarily, in their swift, dashing flight, have retained a relatively short wing, but the hand is markedly lengthened. The long hand, together with long primary flight feathers and short secondaries, results in a narrow, pointed wing. It is to be noted that this pattern of proportion as exhibited by the falcons is that characterized by Böker as *Schwirrflug* (*Apus*, Böker, 1927; also *Chaetura*). The relatively very short humerus, the longer ulna, and the very long hand are strikingly reminiscent of the limb proportions in

cursorial unguligrade mammals (e. g., horse). In the latter, it is well understood that the long manus and pes are an adaptation to speed, making both for great length of stride and rapid recovery. The wing-skeletal proportions of *schwirfliegende* birds might be subject to an analogous mechanical explanation, the clarification of which is but one of the many problems of dynamic anatomy presented by birds and awaiting study.

*Circus* and *Pandion* can also be derived from the accipitrine type; in these forms the whole wing has elongated, as in the soaring types, but the hand is longer. This may be a secondary condition, imposed upon a primary soaring adaptation.

The foregoing is merely a suggestion as to the possible evolution of the types. Evidence probably could be obtained by comparative ontogenetic studies (cf. Böker, 1927).

#### GENERAL CONCLUSIONS

The intramembral proportions of the wing skeleton are not an infallible index to flight habit, except perhaps where they indicate an extreme pattern. In any instance, however, the skeletal proportions have to be considered in connection with various aerodynamic factors (aspect ratio, wing expanse, tail expanse, character of flight feathers, absolute and relative body size, et al.) as well as with psychobiological factors, such as are involved in preferential behavior. All these factors (mechanical, aerodynamic and psychobiological) represent, in Recent forms, the present stage in a continuous evolution; this consideration introduces a phylogenetic factor in flight habit, which can be analyzed by comparative functional-anatomical methods (also, for the first two sorts of factors, by comparative ontogenetic studies).

This brief survey indicates that a promising field of investigation lies open here, for the student who has access to large series of specimens of skeletons and alcoholics as well as of the conventional study-skins.

#### LITERATURE CITED

BÖKER, H.

1927. Die biologische Anatomie der Flugarten der Vögel und ihre Phylogenie. Journ. f. Ornith., 75: 304-371.

1935. Einführung in die vergleichende biologische Anatomie der Wirbeltiere. I. Bd. Gustav Fischer, Jena.

ENGELS, W. L.

1938a. Variability in bone length and limb proportions in the Coot (*Fulica americana*). Journ. Morph., 62: 599-607.

1938b. Cursorial adaptations in birds. Limb proportions in the skeleton of *Geococcyx*. Journ. Morph., 63: 207-217.

1940. Structural adaptations in thrashers (*Mimidae*: genus *Toxostoma*) with comments on interspecific relationships. Univ. California Publ. Zool., 42: 341-400, 24 text-figs.

*University of North Carolina*  
*Chapel Hill, North Carolina*



## FROM COLORADO SPRINGS TO HORSE CREEK IN 1878

BY CHARLES E. H. AIKEN

## FOREWORD

THE following pages were copied from the late Charles E. H. Aiken's notebook some twenty years ago. When I read this account I thought it so interesting that I asked and received his permission to copy it, and I have also received permission from his sisters to publish it in 'The Auk.' The only liberties I have taken with it are to add in brackets the present-day names of the birds he mentions, and to make a few other insertions, also in brackets. The Holt (not Hoyt) Ranch was on Little Horse Creek, as I have ascertained. The main Horse Creek appears to be a dry creek without waterholes.—EDWARD R. WARREN.

Leaving Colorado Springs May 11, 1878, at about 2 o'clock p. m. we traveled ten miles to the Coal Bank [probably at the village of Franceville]. Next day to [Black] Squirrel Creek (cold and foggy). Next day to within ten miles of Davis's Ranch (65 miles) which we finally reached on the day following (14th), and on the 15th of May pushed on to Hoyt's [Holt's] Ranch (75 miles) on Little Horse Creek. The country comprises both level and rolling prairie, with sandy patches west of coal banks, Squirrel Creek, and the vicinity of Cramer's Ranch. Bird life was scarce, Skylarks [Desert Horned Lark, *Otocoris a. leucolaema*] found everywhere, Grass Finches [Western Vesper Sparrow, *Pooecetes gramineus confinis*] occasionally. Meadowlarks wherever there was water and in green hollows. Mountain Plover [*Eupoda montana*] not seen in the first 15 miles but became common as we proceeded eastward. The first White-winged Blackbirds [Lark Bunting, *Calamospiza melanocorys*] were seen at Squirrel Creek, where there was a flock of several hundred, and they were constantly in sight in all places to the eastward. Small flocks of Brewer's Blackbirds haunted all the ranches. An occasional Squirrel or Swainson's Buzzard sailed overhead and several Golden Eagles were seen. Pond Creek and Horse Creek were each the home of two or three pairs of White-necked Ravens. Careful observation over this entire stretch of country fails to reveal a single individual of Baird's Sparrow. Wherever trees or bushes occurred some of the more strictly timber species are liable to be found during the migration. We observed in such places Bullock's Oriole, Louisiana Tanager, Yellow, Audubon's and Black-capped Flycatching [Wilson's or Pileolated] Warblers, Black-headed Grosbeak, Green-tailed and Long-spurred Towhees [*Pipilo maculatus arcticus* and perhaps *P. m. montanus*], Traill's Flycatcher, Say's Flycatcher, Parkman's Wren [*Troglodytes aëdon parkmani*], Red-headed Woodpecker, etc. The Rock Wren, as I have noticed on other occasions, may be found along arroyos and washouts far from either rocks or timber of any kind. I was surprised to find a Lewis's Woodpecker among the cottonwoods on Horse Creek. The Lark Finch [*Chondestes grammacus confinis*] occurs commonly at intervals.

Horse Creek presents the unusual feature in western prairies of permanent pools of water and marshy ground, and I had hopes of finding some unusual conditions

in its fauna. These hopes were but partially fulfilled though some interesting observations were made. The 'creek,' which extends along a hollow or valley between two mesas consists at the northward of a dry creek bed with an occasional waterhole, but its southern extremity consists of deep waterholes of various sizes and purity and alternating with alkaline marshes and brackish pools. The various ducks and geese of the country abound here during the migration seasons, and several species remained at our arrival. Among other Grallae we noticed the Killdeer (of course), Lesser Tatler [Lesser Yellowlegs, *Totanus flavipes*], Red-breasted Snipe [American Knot, *Calidris canutus rufus*], Wilson's Sandpiper [? Wilson's Phalarope, *Steganopus tricolor*], and Baird's Sandpiper, also American Bittern, and Night Heron. In the few bunches of reeds were the (Western) Long-billed Marsh Wren [*Telmatodytes palustris plesius*] and the marshy grounds abounded with Savannah Sparrows.

In the occasional cottonwood trees which occur at intervals along the sand washes may nearly always be found a hawk's nest (Swainson's or the Squirrel Hawk), or, as I have found in three instances, a nest of the White-necked Raven. Sometimes a very small tree is appropriated for this purpose, as in the case where I found a *B. swainsoni* sitting on a nest in a cottonwood only about ten feet high. Eight or ten nests of this species were found but it was evidently a little early for the eggs as but three pairs had laid by the 17th of May. *A. ferrugineus* [*Buteo regalis*] apparently breeds earlier; a clutch of four eggs obtained at the above date were considerably incubated, and a clutch of three taken three days later were at the point of hatching. However, a nest found about the 22d contained but one egg, fresh. This species, it seems, builds both in trees and on the ground, nests having been found in the latter location by Dr. Coues and the sheep-herder who brought me in a set of their eggs in 1876. The full clutch is probably four, but in *B. swainsoni* the greatest number I have known was three. In the method of construction in the nests of these two hawks considerable difference exists. One nest of *A. ferrugineus* which I examined closely was a bulky structure built up of rather slender twigs and matted at the top with dead soapweeds, roots, manure, etc., so as to make a solid bed for the eggs. The nest of *swainsoni* is considerably smaller in size, and constructed mainly of coarse dead twigs. One peculiarity which in itself is almost sufficient to determine the nest is at the time of laying two or three green cottonwood twigs with leaves may always be found in the nest. A parallel phase, however, was noticed in the newest nest of *ferrugineus* where a couple of green weed-stalks were similarly placed.

I was delighted to obtain my first nest of White-necked Raven on the 17th which contained seven nearly hatched eggs. Of two others of the same species found five days later, one contained five half-grown young, and the other six (traces of a seventh having been broken) nearly fresh eggs. Nest cup-shaped, inside of hair and wool firmly matted and woven, outwardly of dry twigs. Another nest not less interesting was that of *Aegialitis* [*Eupoda*] *montana*, one of which containing three eggs was discovered beside the road through the anxiety of the bird. The eggs were laid upon the leaves of a soft prairie thistle with no indication of a nest save the slight depression which the body of the bird had made. The only other eggs found were those of the Skylark and Meadowlark. The White-winged Blackbird is a notably characteristic bird of the prairie, arriving from the south early in May in large flocks; they soon distribute themselves over the prairie where the peculiar actions and contrasted plumage of the males force themselves upon the notice of the most casual observer. Joyous frolicsome little

fellows are they with much resemblance to the eastern Bobolink in habit, song, and general appearance, but with an individuality in all which could not confound it with any other living species. Rising as he begins his song to the height of 15 or 20 feet, he floats along with an easy bat-like flight for several rods, and as the song draws towards its close he sinks slowly to his grass bower. At early morn, at sultry noon, at dewy eve, his song is heard, and even in the stilly night as we lie waking, his pleasant music falls upon our ears.

POSTSCRIPT.—A postscript to Aiken's notes concerning the changes that have taken place in the avifauna in sixty years may be of interest. It is a number of years since I have been in that general region, but the notes then made show that many of the birds Aiken mentions are still to be found in much the same abundance as then. It is quite possible that, because of the settlement of that country in these past years, some of the species have increased in numbers.

The Mountain Plover has decreased greatly in numbers, although there are still a few left. Another bird that has almost vanished is the White-necked Raven. Several years ago it was reported to Aiken that a pair was nesting at either Black Squirrel or Horse Creek, I have forgotten which, and have no note of it. He was much interested in this as in the early days this raven was a common bird here, and this was the first instance of its occurrence he had heard of in a long time. I think these two species are the ones whose numbers have greatly diminished. Probably the Ferruginous Rough-leg and Swainson's Hawks have suffered from thoughtless or ignorant gunners, but even up to his very last years Aiken used to have a good many brought to him. Probably Golden Eagles are not as common.

I doubt if the smaller land birds have diminished much, if any, in numbers; very likely some species have increased. While Horned Larks are not seen in numbers in winter near the city, as they once were, I think that is due to the increase in farms where these birds can obtain food at that season. Ducks and shorebirds still come to the various waterholes and pools, and there are a few reservoirs on the plains to attract them.

Aiken traveled about 75 miles to reach a point about 55 miles due east from his starting point. Geological Survey maps made some forty years ago show only a few roads wandering over the prairie. Now there are plenty of roads and the country has been well settled.

At exactly the same time in May, 1916, I was out on the Colorado Plains about fifty miles farther east than Aiken was. The migration seemed to be in full swing at a ranch where there was a grove of small trees, and I noted many more species than Aiken records. There were seven species of warblers as against his three, and three

sparrows not mentioned by him, besides various other birds. It seems strange to me that Aiken did not see these birds among the trees on Horse Creek, for, with but two or three exceptions, they are birds also to be found about Colorado Springs, either as residents or as migrants.—E. R. W.

1511 Wood Avenue  
Colorado Springs, Colorado

## TARSAL FEATHERING OF RUFFED GROUSE

BY LEONARD J. UTTAL

THE tarsal feathering of the Ruffed Grouse, *Bonasa umbellus*, varies individually, geographically, and subspecifically. The purpose of this paper is to present facts concerning this variation. A few days before the paper was submitted for publication W. E. Clyde Todd (Auk, 57: 390-397, 1940) proposed three new subspecies of Ruffed Grouse: *B. u. monticola* from West Virginia, *B. u. medianus* from Minnesota, and *B. u. canescens* from northern Ontario. Doubtless certain of the writer's statements apply to birds that Todd would include under these names, but he is not at present in a position to borrow the material upon which Todd based his remarks. He strongly feels, however, that in any further study of Ruffed Grouse subspeciation the matter of the tarsal feathering should be closely watched. By the time this paper is published the writer hopes to be investigating this interesting problem further, especially as it concerns the new forms.



TEXT-FIG. 1.—Tarsal feathering of Ruffed Grouse. a, *Bonasa umbellus umbelloides*; b, *B. umbellus togata*; c, *B. umbellus umbellus*. Octavia Bailey, del.

The tarsus of the Ruffed Grouse is feathered on the upper part and more or less bare on the lower part, depending upon the subspecies (Text-fig. 1). There are also subspecific differences in the length and coloration of the tarsal feathers, and the length of the toe pectinations, popularly called 'snowshoes.' Some of these differences are so obvious that I am surprised to find no previously published reference to them. The effect of these differences in living birds makes the more bare-legged forms appear longer-legged than the more



heavily feathered forms. Dr. Arthur A. Allen noticed this when he was experimenting with the artificial propagation of Ruffed Grouse and had the opportunity to observe the heavily feathered tarsus of *B. u. umbelloides* from Alberta side by side with the comparatively bare-legged *B. u. umbellus* from New York State. That the brachypodal appearance of the Alberta birds is illusory is obvious, for in tarsal length they do not differ significantly from New York birds. It was Dr. Allen who introduced me to this phenomenon and his suggestion which inaugurated this study.

Mr. John Trainer has reported on differences in tarsal feathering between three subspecies of Ruffed Grouse, *B. u. togata*, *umbellus*, and *umbelloides*, in an unpublished thesis on the pterylography of the species (MS., Cornell University, 1938). His conclusions, though

PERCENTAGES OF UNFEATHERED PORTION TO TOTAL LENGTH OF TARSUS

| Percentage class | <i>B. u. yukonensis</i><br>♂ ♀ | <i>B. u. umbelloides</i><br>♂ ♀ | <i>B. u. sabinii</i><br>♂ ♀ | <i>B. u. brunnescens</i> <sup>a</sup><br>♂ ♀ | <i>B. u. togata</i><br>♂ ♀ | <i>B. u. thayeri</i><br>♂ ♀ | <i>B. u. umbellus</i><br>♂ ♀ |
|------------------|--------------------------------|---------------------------------|-----------------------------|--|----------------------------|-----------------------------|------------------------------|
| 15-18%.....      | 1                              | 1                               |                             |  |                            |                             |                              |
| 19-22%.....      |                                | 1 1                             |                             |  |                            |                             |                              |
| 23-26%.....      |                                | 4 1                             | 1                           |  | 1 2                        |                             |                              |
| 27-30%.....      | 2                              | 4 4                             | 1                           |  | 9                          |                             |                              |
| 31-34%.....      |                                | 4 1                             |                             |  | 12 14                      |                             | 4 1                          |
| 35-38%.....      |                                | 2 1                             | 1 2                         | 3 1  | 6 10                       |                             | 6 4                          |
| 39-42%.....      |                                | 2 2                             | 2 1                         | 2 5  | 6 7                        | 2 1                         | 8 9                          |
| 43-46%.....      |                                | 1                               | 1                           | 1  | 2 4                        | 2 3                         | 8 7                          |
| 47-50%.....      |                                |                                 |                             |  | 4 5                        | 1 1                         | 8 8                          |
| 51-54%.....      |                                |                                 | 1                           |  | 1                          |                             | 1 4                          |
| 55-58%.....      |                                |                                 | 1                           |  | 1                          | 1                           | 3 2                          |
| 59-62%.....      |                                |                                 |                             |  |                            | 1                           | 5 3                          |
| 63-66%.....      |                                |                                 |                             |  | 1                          | 1                           | 2 1                          |
| 67-70%.....      |                                |                                 |                             |  |                            |                             | 3                            |
| Total (230)      | 3 0                            | 19 10                           | 5 6                         | 6 6  | 42 33                      | 6 7                         | 48 39                        |
| Minimum %        | 17                             | 15 20                           | 27 26                       | 37 37  | 26 26                      | 40 41                       | 34 33                        |
| Mean % (to unit) | 24                             | 30 31                           | 38 41                       | 39 40  | 36 40                      | 47 49                       | 46 47                        |
| Maximum %        | 28                             | 43 39                           | 44 55                       | 44 72  | 56 63                      | 63 60                       | 70 65                        |

<sup>a</sup> Eight specimens kindly measured by Mr. H. B. Conover, the author of the subspecies, following my directions.

accurate, are only indicative as his material was scant and his treatment of the problem merely incidental to a much larger investigation. Mr. Trainer's manuscript, however, was very helpful to me, and I am grateful to the author for allowing me free access to it.

In working out the tarsal-feathering characteristics of the Ruffed Grouse races as arranged in Peters's 'Check-list,' plus *B. u. brunnescens* Conover, I compared percentages of the total length of the entirely unfeathered portion of the tarsus. I obtained these percentages by dividing the distance from the point of insertion of the most distal tarsal feather (always on the inside of the tarsus) to the tip of the lowest frontal tarsal scute by the total tarsal length (the diagonal from the outside of the ankle joint to the tip of the afore-mentioned scute). The percentages of 230 specimens thus obtained are listed by subspecies and sex in the comparative table on page 75.

This table graphically shows the fundamental racial character of the variation in amount of tarsal feathering in Ruffed Grouse. The difference in some cases is substantial and taxonomically useful; in others it is negligible. The genetic nature of this tarsal-feathering character is over and above the individual variation and overlapping apparent in the table, as was attested biometrically.

Standard deviations and standard errors of the mean percentages obtained are (excepting *yukonensis*, of which there was insufficient material):

| Subspecies       | Sex | No.<br>examined | Mean (%) | Standard<br>deviation | Standard<br>error |
|------------------|-----|-----------------|----------|-----------------------|-------------------|
| umbelloides..... | ♂   | 19              | 29.6     | 6.4                   | 1.4               |
|                  | ♀   | 10              | 30.9     | 6.2                   | 2.0               |
| sabini.....      | ♂   | 5               | 38.1     | 5.4                   | 2.4               |
|                  | ♀   | 6               | 41.2     | 10.7                  | 4.5               |
| brunnescens..... | ♂   | 6               | 39.2     | 5.0                   | 2.1               |
|                  | ♀   | 6               | 39.8     | 1.5                   | 0.6               |
| togata.....      | ♂   | 42              | 36.3     | 7.2                   | 1.1               |
|                  | ♀   | 33              | 39.8     | 7.5                   | 1.3               |
| thayeri.....     | ♂   | 6               | 47.2     | 8.1                   | 3.3               |
|                  | ♀   | 7               | 48.5     | 0.0                   | 0.0               |
| umbellus.....    | ♂   | 48              | 46.4     | 10.8                  | 1.6               |
|                  | ♀   | 39              | 46.5     | 7.3                   | 1.2               |

The characteristics of the tarsal feathering of the subspecies of *Bonasa umbellus* may be summed up as follows:

*B. u. yukonensis* (Canadian Northwest and interior of Alaska) and *B. u. umbelloides* (Rocky Mountains):—About a quarter of the tarsus is unfeathered. Individual feathers long and well developed (shafts

of most distal feathers from nine birds averaged 13 mm.), covering bare part of tarsus, usually the hind toe, and sometimes the first phalanges of the fore toes. Thus the tarsus *appears* completely feathered. Feathers pearly, ashy, or mouse-colored, and generally indistinctly barred. Toe pectinations nearly twice as long as those of *umbellus*. Speculatively, *yukonensis* might reveal an even-heavier development of tarsal feathering than *umbelloides* on the examination of more specimens. These two subspecies can be recognized collectively by the very hoary, bushy character of the tarsal feathering, due more than anything else to the prolonged length of the individual barbs (Text-fig. 1, a).

*B. u. sabini* (Cascade Ranges of northern British Columbia to northern California) and *B. u. brunnescens* (Vancouver Island):—Averaging one-third of the tarsus unfeathered. Feathers fairly long, the most distal occasionally reaching to the hind toe. Feathers less bushy (barbs shorter) than in *umbelloides*, dark rusty-brown and usually indistinctly barred. *B. u. sabini* and *brunnescens* are not separable on the basis of tarsal feathering, but are otherwise distinct.

*B. u. togata* (northeastern United States and Canada east of the prairies):—This may perhaps be a composite form. The tarsal feathering is very variable, showing characteristics ranging between those of *umbelloides* and *umbellus*, but averaging, like *sabini* and *brunnescens*, about one-third of the tarsus bare. Most distal feathers often reach to the hind toe or are often fairly short. Color: varying shades of gray (never approaching white), often indistinctly barred. Toe pectinations between those of *umbelloides* and *umbellus* in length (Text-fig. 1, b).

*B. u. thayeri* (Nova Scotia and eastern New Brunswick):—Lower half of tarsus unfeathered. Most distal feathers short and tuft-like, like those of *umbellus* except that they are dark grayish-brown in color. I cannot agree with Todd (Auk, 57: 391, 1940) in relegating this subspecies to the synonymy of *togata*; the tarsal feathering is too radically different. The specimens which I have seen seem consistently sootier (blackier) and more heavily barred on the belly than those of *togata* (including practically topotypes) examined.

*B. u. umbellus* (eastern United States):—Lower half of tarsus devoid of feathers. Most distal feathers very short and tuft-like; usually light gray-brown to dirty white in gray- and brown-phase birds, and extremely pale orange-white in red-phase birds. Toe pectinations about half the length of those of *umbelloides* (Text-fig. 1, c).

On the whole, females seem to have the tarsus slightly less feathered

than do the males, but insignificantly so. Tarsal-feathering characteristics do not hold during the molt. Of course, the toe-pectination characteristics are useful only when these appendages are fully developed, from fall till spring. The amount of tarsal feathering present is as constant in the chicks as it is in the adults. This fact was learned by measuring a large series of known (captive) *umbellus* chicks ranging in age from eight to sixty-four days. The means obtained were gratifyingly close to the means for adults. Of course, material of other races must be examined before this fact becomes fully acceptable.

The variation in the tarsal-feathering development of Ruffed Grouse seems to coincide with the amount and duration of snow which the birds experience. Thus it is to be expected that *yukonensis* and *umbelloides*, coming from regions of deep and lasting snows, would have the greatest development of tarsal feathering and toe pectination. *B. u. togata* lives under climatic conditions more or less intermediate between those experienced by *umbellus* and *umbelloides*, and shows intermediate characters of tarsal feathering. The race experiencing the mildest snow conditions, *umbellus*, shows the least development of tarsal feathering.

In Eurasia there is a genus, *Tetrastes*, which is very closely related to our *Bonasa*. It contains two species, one of which is divided into several subspecies. It has a tarsus similar to that of *Bonasa*. It would be interesting to see if this bird displays geographical variation in its tarsal feathering as does *Bonasa*.

#### ACKNOWLEDGMENTS

I am grateful to many people, who, through their help and cooperation, greatly facilitated my approach to this study. Dr. Arthur A. Allen, of Cornell University, as I have already mentioned, suggested the problem and aided me in the study. Dr. George M. Sutton, Curator of the Louis Agassiz Fuertes Bird Collection at Cornell University, allowed me free access to the collection, offered abundant valuable suggestions, borrowed material, and helped immensely with the manuscript. Others who assisted were Mr. William Montagna, Mr. John Trainer, and Miss Octavia Bailey, who furnished me with a drawing of Ruffed Grouse tarsi.

I thank the officials of the American Museum of Natural History and the New York State Museum for access to their collections. Mr. H. B. Conover aided in submitting measurements of his *B. u. brunne-cens*. Mr. James L. Peters offered suggestions in correspondence, and

incidentally, about ten years previously had identified about two-thirds of the material available to me, an unintentional aid which was of particular importance. Professor J. R. Livermore, of Cornell University, gave me a private introduction to biometry which was of great value.

*Laboratory of Ornithology*  
*Cornell University*  
*Ithaca, New York*



## TAXONOMY OF PALAEARCTIC GOSHAWKS

BY N. A. GLADKOV

THE Goshawk (*Accipiter gentilis*) is distributed in the Palearctic region from western Europe through Siberia to the Japanese Islands and the most northeasterly portions of Asia. Farther to the east it extends to North America. Occupying a vast area of distribution the Goshawk forms a series of subspecies of which the following have been thus far described for Europe: the nominate form *A. g. gentilis*, proper to the Scandinavian Peninsula, *A. g. gallinarum*, described by Brehm for western Europe, *A. g. marginatus* Piller and Mitterpacher and its synonym *A. g. balcanicus* Lönnberg known from the Balkans. For middle Russia, P. P. Sushkin described *A. g. moscoviae*, while the northeast of Europe and the west of Siberia are inhabited by *A. g. buteoides* Menzbier with its synonym *A. g. poecilopterus* Lönnberg. Farther east to the Chukotsk Peninsula and Kamchatka inclusive, there extends *A. g. albidus* Menzbier, a name which has for synonyms *A. candidissimus* Dyłowski and *A. caesius* Buturlin.

*A. g. arrigonii* Kleinschmidt is peculiar to southern Sardinia, *A. g. caucasicus* Kleinschmidt dwells in the Caucasus, *A. g. schwedowi* Menzbier, *A. g. khamensis* Bianchi and, finally *A. g. fujiyamae* Swann and Hartert are distributed over Asia, extending eastward from the southerly part of middle Siberia.

The above-named forms are far from being all universally accepted and the accumulation of material and the study of individual variability have shown that the distinctions between races are certainly not so clear as has been conceived. For verifying the status of middle-Russian Goshawks I was able, besides examining the collections in the Zoological Museum of Moscow University, to use material from Ukraine (Museum of the Academy of Sciences of the U.S.S.R. and that of Kiev University) as well as from the Kirov, Stockholm and Warsaw Museums. Thus I studied about four hundred specimens, which considerably exceeds the number of Goshawks investigated previously by P. P. Sushkin, particularly with respect to eastern-European individuals. This rich material, comprising specimens from Switzerland to the Amur and Kamchatka inclusive, allows me to raise once more the question of individual and geographical variability of the Goshawk. Sushkin indicated that the geographical races of Eurasian Goshawks formed two natural groups: first, the northern group composed of larger races, such as *gentilis*, *moscoviae*,

*buteoides* and *albidus*; second, the southern group including forms of smaller size, to which Sushkin referred *arrigonii*, *caucasicus*, *schwedowi*, *khamensis* and *fujiyamae*. The forms *gallinarum* and *marginatus* were considered by Sushkin as intermediates. The northern subspecies are not distinguishable in size, except *albidus* which is somewhat larger than the others. The southern forms are smaller. Consequently, the differences are reduced to color characters, the western and southern Goshawks being dark, the eastern and northern forms lighter.

The material examined by me serves to confirm once more the fact that Goshawks are subject to considerable individual and age variability, the latter, as is to be noted, being to a certain degree parallel with the geographical variability. Thus, young birds grow lighter with age and by the end of winter the ground color of the under side fades nearly to white. What in *gentilis* is acquired with age, is found in eastern forms, *buteoides* and particularly *albidus*, in the early stages. As to Swedish birds, as they become old they lose more and more the original brownish tints of their plumage, acquiring a bluish hue on the back, while the cross-bars of the under surface become narrower. A comparison of Swedish Goshawks with *buteoides* shows the latter to be more bluish above and to have narrower bars below. A general lightening of the plumage and the absence of a brownish hue become even more noticeable when comparison is made with *A. g. albidus*. The course of age modifications in *A. g. buteoides* is in general the same as in *A. g. gentilis*, yet the former begins to change its plumage, as it were, at a later stage than does *A. g. gentilis* of the same age. This circumstance connected with a wide range of individual variability renders the study of geographical variation in Goshawks extremely difficult. All color characters in European forms of Goshawks, especially in *gentilis* and *buteoides*, are seen to overlap to a considerable extent.

The Goshawk certainly performs distant migrations. In autumn, birds with pronounced characters of *A. g. buteoides* may be encountered in Poland, Hungary and in the south of Ukraine (Ascania Nova). Therefore only material collected from May till August can be utilized for subspecific analysis. A certain admixture of foreign material is always possible among earlier and later collections, while in winter one form may even be completely replaced by another. The same occurs in Siberia and Turkestan. Thus, the specimens of Goshawks in our Museum secured during the non-breeding period in the Altai all belong to *A. g. buteoides* and not to *A. g. schwedowi*. On

the strength of this fact only extreme variants and those approaching them can be identified in the collections made in the non-breeding time, all the others being, practically speaking, indefinable.

In my investigations I have utilized only summer material, and have considered the remainder only after the breeding forms had been studied, which finally proved to be not so very numerous. Most of the Goshawks that I examined pertain to the winter and migration period. By making a strict distinction between breeding and non-breeding specimens I was able to notice an interesting phenomenon which will be discussed below. Thus it appears that young light-colored Goshawks with well-marked characters of *buteoides* occur in our parts, but only in winter or, more exactly, in the non-breeding season. Nothing is known of their summer whereabouts. All the specimens of *A. g. buteoides* under my examination, obtained in the breeding season, were much nearer to *A. g. gentilis* in their appearance than is commonly believed.

Since the work of Sushkin contains very detailed descriptions of all the subspecies of Goshawks studied by him, I find it unnecessary to recapitulate them, but begin directly, therefore, with a comparison of forms, adding only the most indispensable corrections and supplements.

The comparison of adult Goshawks from Sweden, Poland and westerly parts of the Ukrainian Socialist Soviet Republic shows them to be practically indistinguishable.

According to the existing descriptions, *A. g. gallinarum*, to which specimens from Poland are also referable, differs from the nominate race as a somewhat more brownish, but not a darker form. However, variations in this character in both the former and the latter race are very considerable, for some Swedish specimens are of a much more brownish hue than birds of corresponding age from Poland or the westerly portions of Ukraine. The bands of the tail may be strongly reduced, but in some cases the latter is rather bright, its bands having even a faint white edging. Observations on tame Goshawks have shown the reduction of tailbands to be an age modification as well (V. Vietinghoff, 1937). It seems that, perhaps, in some Swedish Goshawks the superciliary stripe is more conspicuous. There are, however, a few specimens from the vicinity of Kiev (a town which according to Sushkin is included in the area of *A. g. gallinarum*), whose superciliary stripes are even more pronounced than in Swedish birds.

As to the under surface, in separate individuals from Sweden its

general color is somewhat purer. Yet there are some Goshawks of a more brownish tint than those from Poland, despite their being in some cases older than the latter. Thus, if in some specimens of Swedish Goshawks the general color of the under side is purer and lighter, while in the others it is more brownish than in birds of central Europe, then, consequently, the distinction, to which a diagnostic significance has been formerly attached, wholly fits into the range of individual variability.

The most detailed comparison of Swedish, Polish and Ukrainian Goshawks was made by me with adult females. Although there were fewer males, all the above comments relate likewise to the latter. Polish specimens are not more brownish than the Swedish birds and, it may be added, Moscow Goshawks are neither lighter nor purer in hue than Swedish. All together they form a general mass indistinguishable in the geographical respect, and showing a very wide range of individual variability. Neither are there any differences in dimensions. Female Goshawks from middle Russia cannot be said to have a lighter coloration than those from Sweden. Rather the contrary is to be noticed. Separate individuals from the Moscow district show less-pure tints than Swedish birds. The tail is either dull or rather bright, and the forehead whitish or blackish. There is also no difference between Swedish and Russian specimens in regard to the development of the superciliary stripe. At first I made the most minute comparison of Swedish females with four adult females from near Moscow, then I joined thereto other females from the area of *A. g. moscoviae* distribution except the most peripheral birds, finding after all no essential distinctions between *A. g. moscoviae* and the nominate form. I have already said some words about males. As to females from the borders of the supposed area of *A. g. moscoviae* distribution, they will be treated somewhat later, when passing to the analysis of *A. g. buteoides* characters.

The comparison of young birds from Sweden and middle Russia shows that the Moscow Goshawks do not differ in mass by the intensity of their coloration from Swedish forms. The range of variability in Moscow birds is so great that it entirely covers all kinds of coloration of young Swedish Goshawks. There occur specimens which are darker than Swedish birds and some of lighter color. It may be recalled that according to P. P. Sushkin's diagnosis *A. g. moscoviae* in juvenal plumage differs from *A. g. gentilis* in being paler on the upper side and more reddish on the mantle, but I failed to notice that detail. Most of the Moscow specimens differ from Swedish



birds in the character of spotting of their under parts, although to a small degree only. For example, spots on the under side of the body of Moscow Goshawks are somewhat narrower, having the appearance of elongated markings, while in some Swedish specimens they are nearly twice as broad and drop-shaped. However, the drop-like form of spots occurs, too, in some specimens of *moscoviae*, particularly on the sides of the body, which creates the appearance of a band. The difference just indicated between the Swedish and the Moscow Goshawks is not sharply displayed and can be traced on only a part of specimens. Two breeding birds with their feathering still incomplete are extremely interesting. The first (from Smaland, dated July 3, 1924) has the ground color of its under surface nearly white and heavily spotted, the spots being almost coal-black; the throat is mottled. On the feathering of the feet the spots are grayer and more rounded, which causes a flecking of a woodpecker type. The second specimen (Smaland, June 27, 1927) is ochraceous below, the spots are narrow, elongated and of a much less intense color than in the preceding bird. The feathering of the feet is one-colored, the thighs alone exhibiting narrow longitudinal stripes. From above, the second specimen is somewhat lighter and more spotted than the first. These two birds sharply differ from each other in the color of their plumage, presenting extreme limits (as far as I know) of variability of Swedish Goshawks in juvenal plumage. The variability of young Moscow birds fits almost entirely into these limits.

It may be said that most Swedish Goshawks in juvenal plumage have somewhat purer tints above, their upper side is gray-brown, while in many Moscow specimens it is rather rusty brown. This feature of distinction is, however, far from being always traceable. A certain variegation of the upper side is more proper to a part of Moscow Goshawks, which thus approach *A. g. buteoides*.

Goshawks from the north of the European part of the USSR, particularly from the Vologda district and Lower Pechora, differ from birds of the Scandinavian Peninsula in being less brownish above, more bluish and with a nape showing the so-called ultraventral coloration (Kleinschmidt) of a more or less pronounced type. Yet in some specimens this coloration is rather faint. The forehead is markedly more whitish than in Scandinavian birds or in those of middle Russia. The tail is not infrequently rather brightly colored, though sometimes there are strongly blurred bars on it too. The under side is lighter, the stripes are narrower. In *A. g. gentilis*, however, the general hue of the under surface seems occasionally to



be purer than in *A. g. buteoides*. Goshawks from the vicinity of Kirov (former Viatka) belong to *A. g. buteoides*. Separate specimens from the same parts, killed in non-breeding time, may even be referred to *A. g. gentilis* or in any case to a form intermediate between this race and *A. g. buteoides*. A part of these Goshawks was examined by P. P. Sushkin who also determined them as being of a transitional type (between *A. g. moscoviae* and *A. g. buteoides* according to this writer's notes made on the labels).

The differences just indicated between the Goshawks from the northernmost parts of Europe (*A. g. buteoides*) and those from Scandinavia and middle Russia (*A. g. gentilis*) become conspicuous only on comparing a large number of specimens; separate individuals are sometimes indistinguishable. I handled some birds from the Lower Pechora, about which it was impossible to say with much confidence that they belonged precisely to *buteoides*, and not to *gentilis*. In such cases instead of the bird's color it is more its provenance that serves as a decisive factor for determination. Adult birds with the most pronounced characters of *buteoides* can be found in the collection among autumn and winter specimens, many of them obtained far from the breeding area of *buteoides*, in the middle regions of the European part of the USSR, in the west of Ukraine, in its south (Ascania Nova), in the Caucasus and Altai. The most typical *buteoides* from the breeding area of that form are also represented by winter specimens (Kirov district). Doubtless, Goshawks from the northernmost parts of Scandinavia (Lapland) should likewise be referred to *A. g. buteoides*.

It is to be noted that contrary to the general trend of the Goshawk variability from west to east, there occur some specimens among *A. g. buteoides* from near Kirov, that have a very dark under side with broad transverse bars and conspicuous longitudinal stripes, so that every separate feather has the same color pattern as those of the Scandinavian, Moscow and particularly south-European Goshawks. The throat is also heavily mottled. In the coloration of their upper side these specimens approach more to *buteoides*. A part of the above birds was investigated by P. P. Sushkin who referred them to *A. g. buteoides*.

Young *A. g. buteoides* are in general of a lighter and more variegated coloration than Goshawks of corresponding age from Scandinavia, middle Europe and middle Russia. However, separate individuals, in case of their being local birds, are hardly separable. There occur some specimens with a pronounced spotting of the under

side, the ground hue of which is rather dark, intensively ochraceous instead of whitish. Occasionally the upper surface, too, is no more variegated than in individuals of *A. g. gentilis*, and the marbling is faintly developed.

Young Goshawks with the most pronounced characters of *A. g. buteoides* as well as adult birds are represented in the collection by autumn and winter specimens only. At this time they may be encountered in Ascania Nova, according to published data in Hungary and in a number of other places lying at a considerable distance from the breeding area of *A. g. buteoides*. It is these wandering birds that create among ornithologists the idea that the form *buteoides* differs sharply from *gentilis*, particularly when in juvenal plumage. Meanwhile local specimens are far from justifying such a notion as to the existence of a sharp distinction between these two races, and in winter there occur not infrequently specimens with typical characters of *gentilis* side by side with birds exhibiting the most well-marked features of *buteoides*. Only in the case of a very restricted number of summer specimens from the northeast of Europe is it possible to surmise that by winter they may acquire the variegated and generally light coloration which characterizes some winter birds. But then the question concerning the whereabouts of those individuals remains unsolved. I have seen no specimen of the second year still keeping its juvenal plumage, which would but a little recall the winter birds of a pronounced *buteoides* type.

It may be pointed out that M. A. Menzbier described this form by using non-breeding birds from the former Province of Wladimir. At any rate the winter specimens of Goshawks under discussion are by no means to be considered as 'typical' or practically speaking, as average representatives of the form *A. g. buteoides*. They are, on the contrary, but extreme representatives of the form indicated, having gone farther than any others in the direction which is in general characteristic of *A. g. buteoides* as distinguished from *A. g. gentilis*.

Among the nomadic specimens, I have seen four skins belonging apparently to the whitish form. In their appearance they approach nearer to the dark form of *A. g. albidus* than to the dark (normal) form of *A. g. buteoides*. The breeding place of these light-colored *buteoides* as well as that of other extreme representatives of the same species remains unknown with the exception of a single find on the Nadya River, affluent of the Gulf of Obi, mentioned by I. N. Shukhov and P. P. Sushkin. These birds are, perhaps, characteristic of the forest-tundra of western Siberia.

One specimen in juvenal plumage, killed near Krasnoyarsk in winter, is practically indeterminable. It may be referred with equal success to the whitish form of *buteoides* or to the dark form of *albidus*.

With regard to *A. g. albidus* I am unable to add anything to what was said by P. P. Sushkin, for I could examine only a few specimens belonging to this form. The distribution area of the latter is usually indicated as east of the river Yana. At the same time there are reasons for believing that over the extreme north of Siberia in the forest-tundra region, *A. g. albidus* is distributed even west of the Yana. In the Museum there are, it is true, some non-breeding specimens from Jigansk on the Lena and from the Lower Yenisei, Igarka, September 29, 1905. Are they to be considered as a white phase of *buteoides*? South of the distribution area of *A. g. albidus*, in the Far East, we encounter *A. g. schwedowi* and *A. g. fujiyamae*. As I have seen but few specimens of the latter form, I omit it from consideration. The form *A. g. khamensis* occurring in southeastern Tibet is quite unknown to me; P. P. Sushkin leaves it in his work under a note of interrogation, while most authors reduce it to the synonymy of *A. g. schwedowi*. West of *A. g. fujiyamae* area the south of Siberia is inhabited by *A. g. schwedowi* Menzbier; the latter form ranges north as far as Yakutsk and Krasnoyarsk and reaches Barnaul in the west. This form is well characterized as being small in size and dark in color with a well-developed bluish tint to its plumage. It differs rather conspicuously from the northern form of the Goshawk, *A. g. buteoides*, but the distinctions from other races belonging to the southern group of subspecies (e. g., from *A. g. caucasicus*) are much less pronounced.

In the vicinity of Krasnoyarsk it is possible to encounter in non-breeding time both typical, easily determinable *A. g. schwedowi* and well-marked *A. g. buteoides*. Besides, as I have already said, in the same locality there was obtained a Goshawk intermediate in type between the whitish form of *A. g. buteoides* and the dark form of *A. g. albidus*. In winter, in the Altai, *A. g. schwedowi* seems to be fully replaced by *A. g. buteoides*.

However strange it may appear, up to the present the status of Goshawks inhabiting the vast territory of the south of western Siberia and the north of Kazakhstan between the Altai and the Ural, has remained unknown. In our Museum this region is represented for the most part by birds secured during the non-breeding period. Goshawks in juvenal plumage occurring in those localities seem to approach more to *buteoides*, while in old age they are nearer to

*schwedowi*. A specimen obtained November 28, 1927, near Sterlitamak deserves particular attention. It is an old male, comparatively small in size (wing, 332 mm.) and very light. The blue tint of the upper surface of the body shades off into an ashy hue or, as I would say, into grayness. In this respect the specimen from near Sterlitamak is quite identical with a representative of the dark form of *A. g. albidus* from Srednekolymsk which I have examined. On the under side of the body the obliteration of the dark pattern is also very well marked and the barring there is delicate and fine. It is remarkable that P. P. Sushkin, too, had a Goshawk from near Kustanai, basin of the Upper Tobol River, killed March 27, which was colored above like a beautiful old *schwedowi*, but presented an exaggeration of white patterns and an abnormally fine barring of the under side.

Apparently Goshawks from the southern part of West Siberia deserve to be separated as a peculiar form. I refrain as yet, however, from describing it, since our modern notions concerning the individual and age variability of Goshawks and their migrations in non-breeding time do not allow any description to be made without being confirmed by a sufficiently large series of local specimens. Goshawks from near Pensa seem already to represent a transition from *A. g. gentilis* to *A. g. schwedowi*, or, more accurately, they should be referred to the still-undescribed form of Goshawk from the southern parts of West Siberia, to which we shall also refer Goshawks of the lower Volga and of the environs of Kuibyshev and Orenburg. On the middle Volga (near Ulianovsk) a transition from *A. g. gentilis* to *A. g. buteoides* might be expected, but birds, which I handled, approached more the type occurring in the south of western Siberia and in the north of Kazakhstan.

Caucasian Goshawks are easily distinguished from *A. g. gentilis* of middle Russia. In winter they may be found outside their breeding area as, for example, near Taganrog. I am unable to add anything more to the description of this form, than what has already been said by P. P. Sushkin, but it is to be noted that the differences between *A. g. caucasicus* and the Balkanian form of *A. g. marginatus* still remain obscure to me. I am totally unacquainted with the latter race, but judging from descriptions and knowing the general character of the Goshawk variability, it is permissible to suppose that in the absence of a sufficiently large material these two races are to be united. Unfortunately we know almost nothing about Goshawks from Asia Minor.

Thus, the taxonomy of Palearctic Goshawks appears to be as follows: The nominate form, *Accipiter gentilis gentilis* (Linnaeus), occupies Scandinavia except its northernmost parts (Lapland), Baltic countries, eastern Europe northward to Vologda approximately, eastward to Kirov (exclusively) and, speaking generally, as far as Volga. Goshawks of middle Europe are also referable to this form which has for synonyms *A. g. gallinarum* and *A. g. moscoviae*. Without knowing *A. g. marginatus*, I do not take it upon myself to judge where lies the limit between that form and *A. g. gentilis*, but to all appearance the territory which was formerly considered as the breeding area of *A. g. gallinarum* must be divided into two parts: the larger one including the distribution area of the nominate form, i. e. of *A. g. gentilis*, and the smaller southernmost part formed by that of *A. g. marginatus*.

The next form, *Accipiter gentilis buteoides* Menzbier, extends from the northernmost parts of Scandinavia eastward across the northern regions of the Soviet Lapland, Archangelsk and Vologda districts into the vicinity of Kirov and farther east into western Siberia. In the non-breeding period it is widely distributed over the whole of eastern Europe and Scandinavia, occurring in Germany, Poland, Hungary, in the south of Ukraine (in Ascania Nova); it reaches the Caucasus, appears in Central Asia and in winter replaces in the Altai Mountains *A. g. schwedowi* which is known to breed there. *Accipiter gentilis albidus* Menzbier ranges from the river Yana eastward to Kamchatka inclusive. There are reasons for believing that over the extreme north of Siberia in the forest-tundra region this Goshawk is distributed much more to the west than the Yana.

Sakhalin and the Japanese Islands are occupied by *Accipiter gentilis fujiiamae* Swann and Hartert, a form whose existence I am, unfortunately, unable either to confirm or to refute, having had too restricted a material at my disposal.

*Accipiter g. schwedowi* Menzbier lives in southern Siberia, occurring also on the Amur River. I know it goes north as far as Krasnoyarsk. In winter it appears in the Tian Shan. The form *Accipiter gentilis khamensis* Bianchi remains quite unknown to me.

Goshawks from the southern part of West Siberia and from northern Kazakhstan as well as from the Lower Volga have still to be submitted to a careful study in taxonomic respect.

*Accipiter gentilis caucasicus* Kleinschmidt dwells in the Caucasus, in the forest region of the Crimea and, as P. P. Sushkin supposed, in northern Iran. It is possible that later on this form will be united



with *Accipiter gentilis marginatus* Piller and Mitterpacher and then the name *A. g. caucasicus* will be dropped into synonymy.

I am wholly unacquainted with the form *Accipiter gentilis arrigonii* Kleinschmidt; it inhabits Sardinia and probably Corsica. Its distinctions from *A. g. marginatus* are not quite clear to me.

Thus, the principal thing which I assert in this paper is the necessity of uniting Swedish, Middle-European and East-European Goshawks into one geographical race under the name of *Accipiter gentilis gentilis* (Linnaeus). The same opinion has been already partially advanced by some experienced authors (e. g., by Stresemann and G. Dementiev), but it has not received its proper recognition as yet. The recent review of a vast material allows me to affirm this statement in a more categorical form. At the same time it may be indicated that P. P. Sushkin, whose authority and thoroughness of investigation serve as a most weighty argument for separating *A. g. moscoviae*, has described this form not without hesitation. As regards *A. g. gallinarum* a number of writers have expressed their doubt as to the reality of the above form in connection with a series of characters. My investigation serves to confirm once more that those doubts were well founded, for there exist neither the form *A. g. gallinarum* nor *A. g. moscoviae*.

#### LITERATURE CITED

KLEINSCHMIDT, O.

1922. Die Realgattung Habicht, *Falco palumbarius* (Kl.). Berajah, Leipsic, pp. 21-26, 8 pls.

LÖNNBERG, E.

1923. Some remarks on palaeartic Goshawks. *Ibis*, (11) 5: 211-217, pl. 11.

SCHJØLER, E. L.

1931. Danmarks Fugle. Vol. 3, Rovfugle (Falconiformes), pp. 263-284, pls.

STEGMANN, B.

1937. Falconiformes, in: Oiseaux, vol. 1, no. 5. Faune de l'URSS, new ser., no. 14, viii + 293 pp., 15 pls.

STRESEMANN, E.

1935. Ist *Accipiter gentilis* "gallinarum" eine unterscheidbar Rasse? *Ornith. Monatsber.*, 43: 28-29.

SUSHKIN, P. P.

1928. Notes on systematics and distribution of certain palaeartic birds: second contribution. *Proc. Boston Soc. Nat. Hist.*, 39: 1-32.

Zoological Museum, University of Moscow  
Moscow, U.S.S.R.

## GENERAL NOTES

**Pelicans killed by lightning.**—Although press reports of the destruction of birds in flight by bolts of lightning are not unknown, the present writer has considered that most of the alleged fatalities from this cause have been due chiefly to an over-active imagination. Investigation, however, reveals the fact that there are a few substantiated cases, to which the following may be added.

Among newspaper clippings received by the U. S. Biological Survey was an Associated Press dispatch from Nelson, Nebraska, under the date of October 29, 1939, to the effect that "lightning struck a flock of pelicans flying across the Emil Schlieff farm northwest of here, killing 33." A letter addressed to Mr. Schlieff at Nelson, making inquiry regarding the accuracy of the statement, brought an interesting reply. Writing from Lawrence, Nebraska, on November 9, 1939, Mr. Schlieff (the press dispatch had misspelled the name) stated that the occurrence took place on April 4, 1939, when there had been a series of heavy thunder-showers. Anticipating that water would be over the road, Mr. Schlieff's 14-year-old son Arthur started on horseback about 3.30 in the afternoon to meet his two younger brothers who would then be on their way home from school. While he was on the road, a bolt of lightning struck within 100 yards of him, and on looking in that direction he observed a flock of 75 White Pelicans (*Pelecanus erythrorhynchos*), flying about 100 feet above the ground and from which 34 were falling. One fell in a pool of water but revived in a few minutes and flew off in the direction taken by the rest of the flock. The others were dead and on some the feathers were singed. Mr. Schlieff's letter concludes with this comment: "This is a true and correct statement."—FREDERICK C. LINCOLN, *Biological Survey, Washington, D. C.*

**Louisiana Heron in Massachusetts.**—On September 7, 1940, as I was working the Rowley River salt marshes with the Misses Ruth and Lois Batchelder in their power-boat on the lookout for birds, there crossed our bows at no great distance a medium-sized heron with dark upper parts and a white belly. Though none of us had ever seen a Louisiana Heron in life, we were, collectively, familiar with its appearance in pictures, and that was the species that immediately occurred to us. The tide was high and we followed the bird about through river and creeks, and though we never got very near, we saw it clearly enough to get the diagnostic colors and markings: general appearance resembling that of the Little Blue Heron; upper parts, including wings, blue; a white area on the back (like a Dowitcher, as one of us remarked); under wing-coverts white; belly white, with a sharp line of demarcation on the breast; reddish on the neck. Later consultation of books and examination of skins in the Museum of Comparative Zoölogy convinced me that the bird was indeed a Louisiana Heron (*Hydranassa tricolor ruficollis*), a species new to New England, not having been reported before, so far as I can learn, from farther north than Long Island, New York. While we watched the bird it was within the limits of the town of Ipswich, Massachusetts. It is, of course, regrettable that this observation could not have been fortified with a specimen, but confirmation was obtained when the bird was seen distinctly the next day by Mr. S. Gilbert Emilio, of the Peabody Museum, Salem, and Mr. Charles P. Preston, of Virginia. Mr. Preston had been familiar with the species in the South. It was also seen in the same marsh, September 15, by Mr. Wendell Taber. All three of

these men were satisfied with the identification.—FRANCIS H. ALLEN, *West Roxbury, Massachusetts.*

**Winter food of Snow and Blue Geese in Delaware.**—The commonest winter food of the Snow Goose on the marshes of the Bombay Hook Migratory Waterfowl Refuge, in central Delaware, consists of the roots and culms of *Spartina alterniflora*, commonly known as salt-marsh cordgrass. While studying a flock of 3,700 Snow and 18 Blue Geese (*Chen hyperborea atlantica* and *C. caerulescens*) on the refuge, December 11, 1939, at a distance of 300 feet, I noticed them feeding to a considerable extent on several other grasses in the vicinity. Investigation revealed that both *Spartina patens* (salt-meadow cordgrass, or bent hay) and *Distichlis spicata* (saltgrass) had been used consistently for food; not only were fragments of the roots strewn around on the surface, but holes in the mud leading down to the roots were frequent, and in some cases the holes were ringed with the tell-tale evidence of white feathers from the necks of the Snow Geese.

This particular flock was later observed for several hours at midday at a distance of about 100 yards. Most of the birds were resting and some few were feeding. There were always a few birds in the air, but since it was a cold, windy day, the majority of the birds were relatively immobile.

Dr. Clarence Cottam in a summary of the known observations of the Blue Goose in the Atlantic Coast States (Auk, 52: 436, 1935) gives but one record for the State of Delaware, and that was based on a single bird shot by a gunner. Therefore, these additional data should be of interest.—L. W. SAYLOR, *Patuxent Research Refuge, Bowie, Maryland.*

**Breeding grounds of Ross's Goose at last discovered.**—With the discovery of the Snow and 18 Blue Geese (*Chen hyperborea atlantica* and *C. caerulescens*) on the breeding grounds of Ross's Goose (*Chen rossii*), one of the last of the major mysteries of our more northern birds has been solved. By a process of elimination the country north of the Thelon River and east of Great Bear Lake in the Northwest Territories of Canada seemed the last remaining probability for the nesting area of this species. The interest of various officers of the Hudson's Bay Company was aroused in the subject and under the authority of Mr. R. H. G. Bonnycastle of the Fur-trade Department of that company, Messrs. Angus Gavin of the Perry River, and E. Donovan of the King William, Posts undertook an investigation of the area. Ascending the Perry River some thirty miles from its mouth July 1 of the past summer (1940) some tundra lakes were reached. On rocky islets in some of these lakes considerable concentrations of Ross's Geese and a few Blue Geese (*Chen caerulescens*) were found breeding. Photographs of incubating birds, nests and eggs, and skins and eggs of the former were secured. These have been received by the National Museum of Canada and fully identified. The Perry River empties into the Arctic Ocean at the bottom of the Queen Maude Gulf about longitude 102° west. The terrain occupied is a low-lying ancient sea bed with little relief and many lakes of various shapes and sizes studded with rocky islets. A full account is under publication in 'The Beaver,' the house organ of the Hudson's Bay Company, and in the 'Canadian Field-naturalist' for December 1940.—P. A. TAVERNER, *National Museum of Canada, Ottawa.*

**Mallard Duck returns to destroyed nest.**—Late on the afternoon of May 19, 1939, we were driving along a country road three miles east of Mooresville, Limestone County, Alabama, and chanced to see a severe grass fire, which had been

started by farmers to burn over a 50-acre broom-sedge field adjoining Wheeler Lake. The following day we returned to the area to see whether wildlife had suffered from the fire.

In addition to a destroyed rabbit's nest, which contained the charred remains of several young, and a number of unidentified nests of ground-nesting birds, we found approximately 100 feet from the edge of the water, a nest containing nine eggs of the Mallard Duck (*Anas platyrhynchos*). Although the eggs had been carefully covered with down before the bird left the nest, either to feed or to avoid the advancing flames, the entire clutch was destroyed. We noted the burned condition of the eggs as well as the deep layer of ash that covered the ground. Of still greater significance, however, were the tracks of the duck leading to the nest. Apparently the bird had returned to the nest despite the fact that all landmarks had been destroyed by the fire, inspected it, and abandoned further incubation of the eggs. Another set of tracks leaving the nest at an angle of about 45 degrees from those leading to it indicated that the bird had walked away some distance before taking wing. It is interesting to note that when leaving the nest she walked away from the water, rather than toward it. The tragic story of her last visit to the nest was clearly recorded in the soft, deep ashes covering the soil.—ROBERT H. SMITH and ALBERT H. TROWBRIDGE, *Wildlife and Fish Service, Washington, D. C.*

**Daily movements of young Black Duck.**—While in residence at the Edmund Niles Huyck Preserve, at Rensselaerville, Albany County, New York, during the summer of 1939, a brood of Black Duck (*Anas rubripes tristis*) was under daily surveillance. The observations were made at Lincoln Pond, a small body of water approximately nine acres in area located at an altitude of 1650 feet in the Helderberg Mountains. The pond was bordered partly by a growth of shrubs (mostly *Alnus incana*). There was a considerable stand of large hemlocks (*Tsuga canadensis*) at the north end. A shallow shelf of ooze bottom extended around three-fourths of the pond and supported a copious growth of emergent grasses and sedges which served as excellent shelter for ducks.

A brood of eleven young led by a female was first seen at dusk on June 27 moving from the north end of the pond to the grassy border on the west side 250 yards away. The ducklings were approximately four to five inches long at this time. Observations on succeeding days revealed that the female and young made this evening journey regularly for a period of six weeks. Throughout the day the young remained among the sheltering grasses at the north end of the pond having moved to this locality during the early morning hours. At night, at least from dusk until 2 a. m., they could always be found in a rather small area extending over fifty feet of shore line. They usually stayed close to shore under the alders. When disturbed they would ordinarily take to shore apparently guided and kept together by the female's call notes. Occasionally they would hurry away through the grass to the open water. They came to this spot as late in the season as August 16 when the young were capable of short flights although now only five ducklings were left. Two young were found dead at the night station but the cause of death was not apparent from a casual examination. Among the predators, rats, pickerel and bullfrogs were especially active at night and may have accounted for some of the other young. Up until August 31, the last day of my stay at the Preserve, this group of five young was often seen changing position in the evening after feeding at the north end of the pond during the



day. However, they no longer returned to the place where they formerly spent the night.—EDWARD C. RANEY, *Cornell University, Ithaca, New York.*

**American Golden-eye a winter resident of Kansas.**—During the period from December 1939, to February 1940, while pursuing an ecological study of Ft. Leavenworth and vicinity, I observed six American Golden-eyes, *Glaucionetta clangula americana*, feeding in a section of open water on the Missouri River.

Between December 20 and January 2 they fed twice daily over this region which was directly in the channel of the river. The ducks would arrive about 8 or 9 a. m. and remain until 11 or 11.30 a. m., when they would fly farther upstream where they spent considerable time on the bank, which was thickly overgrown with brush, but within a few yards of a 'water-hole' in the ice-bound river. They would be back at their feeding grounds between 3.00 and 3.30 p. m., where they remained until dusk before leaving for their night retreat farther up stream.

The Golden-eyes were in the typical winter plumage but evidently they were mated for they fed more or less in pairs. They were unmindful of quiet intruders and were studied through glasses at a distance of thirty or forty yards during every weekend throughout the cold weather of January and February. With the advance of warm weather the ice disappeared and the ducks were last seen February 25, 1940.

So far as is known this is the only instance of American Golden-eyes being observed as winter residents in Kansas. The Kansas University Museum of Birds and Mammals has records of these ducks being taken as late as December 15, 1934, and as early as March 2, 1886.—MALCOLM J. BRUMWELL, *Museum of Birds and Mammals, Lawrence, Kansas.*

**Turkey Vulture in Rhode Island.**—On August 3, 1940, while motoring from Cape Cod to Newport, my uncle, Mr. Henry M. Hall, and I identified a Turkey Vulture, *Cathartes aura septentrionalis*, about a mile inside the Rhode Island boundary from Fall River. The range was fairly close. Forbush, in his 'Birds of Massachusetts and other New England States' (2: 89, 1927) says of it: "Occasional; five records are given by Howe and Sturtevant in the Birds of Rhode Island and there are others" to which he adds a Block Island bird seen in March 1920. Evidently the bird is not rare in that State.—HUGH BIRCKHEAD, 433 Monterey Ave., Pelham Manor, New York.

**Three thousand Golden Plovers in one flock, Delaware County, Indiana.**—A forty-acre field teeming with Golden Plovers (*Pluvialis dominica dominica*)! It was my good fortune to witness this unfamiliar and heartening pageant on the morning of April 21, 1940. Motoring, searching for migrants, I caught the glint of sunlight on restless golden-brown wings a quarter of a mile away. Driving closer, I gaped in astonishment at the host of birds scattered all over the plowed black soil. Recovering, I hastened home for my wife, so she could share the treat. When we returned, the plovers had concentrated along the banks of an overnight brook, which split the field some sixty rods from the road.

We admired the birds for several minutes. They were constantly changing position, so we had several opportunities to observe the characteristic concerted effort as they wheeled, banked and settled as one bird. One such movement involved almost the entire flock—a veritable cloud of birds. They chattered like chicks in a brooder, disturbed in the middle of the night. Other notes resembled those of the Killdeer.



With the aid of my 8-power binocular, I counted one thousand (first by twos and last by twenties) and estimated that there were twice as many more. Most of them were in winter dress. Every tenth one wore the mottled feathers of the prenuptial molt; one in every hundred or so had attained adult breeding plumage. Later in the day (5.00 p. m.) we came across two scattered flocks of 150-200 each, three miles from the concentration ground, but the main body was still there.

A farmer living nearby told me that he had seen the plovers for about ten days. They left the field (which should yield a bumper corn crop next autumn) on the night of April 23, but I saw a flock of seventy-five the next noon, one mile from headquarters. These departed that night.

While I have recorded the Golden Plover nearly every spring in Indiana during the past ten years, I had never before seen more than one hundred and fifty in one flock. I hope the increase is general and permanent.—HAROLD A. ZIMMERMAN, Muncie, Indiana.

Broken-wing performance by the Eastern Willet.—Vogt (Proc. Linn. Soc. New York, no. 49: 21, 1938) reports that he has not observed a 'broken-wing' display by the Eastern Willet (*Catoptrophorus s. semipalmatus*) in New Jersey, and also quotes an account of mine (Nature Mag., 31: 14-16, 1938) to the same effect. When my account was written, I naturally believed it correct, but now find it necessary to report that this behavior has been observed occasionally in our local (Georgia and South Carolina) birds.

One account was found in some old notes of mine, made long before the display had more than the old-fashioned significance to me. Two other instances have been seen in the last year or so. The performance has been noticed only in birds flushed from eggs, and not in parents guarding the young after hatching. Many other species seem more prone to display when with young than before hatching, in my judgment.

The term 'broken-wing' does not fit the performance of this species very well, for the bird postures by spreading wings and tail, crouching and moving off with a very slight beating of the wings. There is little appearance of being crippled, but it obviously is the equivalent of the 'cripple' performance in other species.—IVAN R. TOMKINS, U. S. Dredge DeWitt Clinton, Savannah, Georgia.

Curlew Sandpiper in New England.—On August 4, 1940, I found an adult Curlew Sandpiper (*Erolia testacea*) in practically full breeding plumage on the shore of the pond at Monomoy Point, Cape Cod, Massachusetts. The bird, after being watched for some time, most of it in close company with a Wilson's Phalarope, was collected and it is now mounted in the New England Museum of Natural History. This is the first record of this European species for fifty-one years in New England. In recent years a Curlew Sandpiper has been seen in several spring and several fall migrations on Long Island, New York. There is the interesting possibility that most if not all of these records will boil down to one individual.—LUDLOW GRISCOM, Museum of Comparative Zoology, Cambridge, Massachusetts.

Skua off Nova Scotia.—Supplementing the recent note by David L. Garrison on the 'Northern Skua in Massachusetts' (Auk, 57: 567, 1940), it may be worth recording that on August 5, 1940, I saw a Skua, presumably *Catharacta skua*, five miles southeast of Cape Sable, Nova Scotia.—J. C. GREENWAY, JR., Museum of Comparative Zoology, Cambridge, Massachusetts.

**Gull-billed Tern nesting in Florida.**—In the April 1940, 'Auk,' Alexander Sprunt reported the nesting of Gull-billed Terns (*Gelochelidon nilotica aranea*) in Florida. On June 21, 1940, I found a small colony in the north end of the Indian River, near the Haul-over Canal. On June 30, there were eight nests, with a few young recently hatched. The birds came readily to a blind, and while no specimens were taken, they were photographed with some two hundred feet of kodachrome. There have been a few reports of this species in the Haul-over area in recent years, sight records of one or two birds, but this is my first contact with Gull-billed Terns in over thirty years of observation along the Florida east coast.

Attention may here be called to the previous record of a nest with two eggs of this species found near Pensacola Bay, Florida, by Francis M. Weston (Auk, 50: 215, 1933).—R. J. LONGSTREET, *Daytona Beach, Florida*.

**Foot-washing by the Black Skimmer.**—Pettingill (Auk, 54: 343, 1937), in discussing injury-feigning in the Black Skimmer (*Rynchops n. nigra*), tells of seeing the birds swoop down to a shallow pool and drag their bellies in it. This bit of behavior has been familiar to me for years, and I have thought it to be simply foot-washing. It has been noticed most often among birds in winter or early spring, or among the non-breeders that remain on the sandbars in winter plumage during the nesting time. It has not appeared to be connected with any of the behavior peculiar to the reproductive season.

Flocks of skimmers often congregate on sandy shores where there is some mixture of mud or clay, and when disturbed the entire flock will swing out over the water and repeatedly dip the feet and the lower belly in the water. There is then no appearance of nervousness about it, and the habit is as common as the oft-reported gull habit of 'picking its teeth' or scratching its head, with a toenail, while in flight. Skimmer legs are small and would soil the belly feathers if pulled up when covered with mud or clay.

While on the subject of skimmer feet, the very inadequate size and musculature of the feet and legs present counter evidence against Arthur's theory (Auk, 38: 566-574, 1921) that the species feeds as a wader. The bird has enough difficulty landing on a good hard beach at times, ever to be able to maneuver those long wings and that weather-vane head in a flawy breeze, and display enough agility to catch small fishes, in the bare inch of water its length of leg would allow. The water of the Savannah River is usually quite yellow, and easily stains white feathers. If the skimmers waded at all, our local birds would have the belly feathers soiled, rather than immaculate.—IVAN R. TOMKINS, *U. S. Dredge DeWitt Clinton, Savannah, Georgia*.

**Saw-whet Owl in Tennessee.**—On March 16, 1940, two high-school boys, Leslie and Eugene Davis, caught a Saw-whet Owl (*Cryptoglaux acadica acadica*) at their home in a closely built residence section of Nashville, Tennessee. As it perched high in a rose vine, they reached it with a ladder, later taking it to their biology teacher, M. S. Carter, who brought it to me for feeding and banding. This constitutes the second positive record of this species for the State. The other individual was seen on March 1, 1936, at Memphis by Ben B. Coffey, Jr., who almost caught it (The Migrant, 7: 19, 1936).

When received by me, the owl weighed 100.8 grams. It snapped its beak belligerently when one put a hand near it. In a few days it weighed 104.5 grams, had adapted itself to its new environment to such an extent that it had ceased



SHARP: GAMBEL'S AND WHITE-CROWNED SPARROWS IN PENNSYLVANIA



LASKEY: SAW-WHET OWL IN TENNESSEE



l  
c  
l  
s  
v  
s  
a  
T  
t

w  
w

M  
w  
ta

w  
N

er  
at  
du  
fe  
fir  
da  
th  
ins  
fe  
bo  
of  
wh  
can  
the  
con  
Ba  
fly  
ove

S  
cat  
in  
it  
by  
into  
pro  
Th

its snapping, and from the benign expression of its eyes when its head was rubbed, had learned not only to tolerate but to enjoy that attention from me. It was given freedom of the house at intervals when it usually flew to a perch on a door or a curtain rod where it sometimes preened, stretched, shook plumage, and occasionally dropped a pellet. At first it was force-fed with lean round steak, small pieces of which were placed in its mouth after forcibly opening the beak. Very soon, mice, House Sparrows, and other freshly killed birds, found on the highway, were added to its menu. The little owl showed a marked preference for mice, swallowing them as soon as they were placed (dead) in the cage. It showed fear of a live House Sparrow placed with it, fluttering to the opposite side of the cage. The dead birds were not eaten until the owl became very hungry. Usually only the head was consumed and most of the birds offered had to be removed.

The face of this owl (Plate 4) was predominantly gray in color without the white markings about the eyes shown in most plates and photographs of Saw-whet Owls. The back was grayish brown. The flattened wing measured 149 mm.

A hippoboscoid fly was collected from its plumage and was identified by K. W. MacArthur of the Milwaukee Public Museum as *Lynchia fusca* (Macquart). He writes: "Up to the present time, to the writer's knowledge, this species has been taken from hawks and owls from the western States and from Florida."

The little owl was released in excellent condition on the night of April 2, 1940, when it immediately flew into the woods.—AMELIA R. LASKEY, *Graybar Lane, Nashville, Tennessee.*

**Feeding and disposition of nestling feces by the Kingbird.**—A nest of the Eastern Kingbird, *Tyrannus tyrannus*, was under daily observation at Lincoln Pond at the Edmund Niles Huyck Preserve, Rensselaerville, Albany County, New York, during late June and early July 1939. Since the disposition of the nestling feces appears to be unique, the following note may be of interest. During the first ten days in July the young Kingbirds in the nest were fed largely on damselflies and dragonflies. The female easily captured these large Odonata on the wing as they hovered over the grassy border of the pond; many other insects which had fallen on the surface of the pond were picked up by the female. After feeding, the feces of the young were taken one by one to a boat dock 180 feet away where each was laid. In several days a long row of feces was present on the dock as well as on the back seat of a rowboat which was fastened to the dock. When the dock was occupied, the feces were carried to a point approximately 330 feet from the nest and deposited along the edge of a large flat stone topping a wall near Lincoln Pond dam. As far as could be observed no place other than the two localities mentioned was used. Barn Swallows (*Hirundo erythrogaster*) nesting in a barn nearby would often fly out over the pond, a distance of up to 300 feet, and drop the nestling feces over the water.—EDWARD C. RANEY, *Cornell University, Ithaca, New York.*

**Scissor-tailed Flycatcher in Quebec.**—On October 30, 1938, a Scissor-tailed Flycatcher, *Muscivora forficata*, was found alive but in a highly weakened condition in a ditch in the town of Noranda, Quebec. An attempt was made to restore it but it died in the night. Fortunately the remains were preserved and mounted by Mr. J. A. Hedge and have lately been presented to this museum through the intermediary of Mrs. L. C. Bent. Noranda is a mining town near the Ontario provincial boundary and about thirty miles south and east of Lake Abitibi. There are in this museum two other Canadian specimens of the species, both



from York Factory, Manitoba, on Hudson Bay, taken forty-four years apart, November (?) 1880, and October 2, 1924. There are records of other Canadian specimens: Portage la Prairie, Manitoba, October 13, 1884 (Auk, 5: 218, 1888); Point des Monts, Quebec, August 14, 1894 (N. Comeau, 'Life and Sport on the North Shore,' p. 434, 1909); Clarendon Station, New Brunswick, May 21, 1906 (Auk, 23: 460, 1906); Alma, Albert County, New Brunswick, June 20 (year?) (Bull. Nat. Hist. Soc. New Brunswick, 6: 64, 1908); Whale Cove, Grand Manan, New Brunswick, October 26, 1924 (Canadian Field-nat., 39: 86, 1925). Besides these actually taken, are credible sight records of this unmistakable species for southern Manitoba in 1899, 1908, and 1930.—P. A. TAVERNER, *National Museum of Canada, Ottawa.*

**Tree Swallows and highways.**—Abbey Dawn Sanctuary near Kingston, Ontario, has great stretches of marsh land where it borders the St. Lawrence River. Among the vegetation, largely *Typha*, migrating Tree Swallows (*Iridoprocne bicolor*) find suitable overnight roosts. On September 14, 1938, Wallace Havelock Robb, the founder of the Sanctuary, was called to the highway that crosses the marsh. He found speeding cars were killing many of the swallows and more than one hundred dead birds were counted along the half-mile strip of pavement. When one of them was hit the others nearby would swoop around the victim and in turn be caught by following cars. The trap was self-baiting and the killing continued all day. By the next morning the survivors had departed. While a few birds and animals are killed each year on this part of the road, Mr. Robb states that this is the first time he had ever noted Tree Swallows caught in numbers.—G. C. TONER, *Gananoque, Ontario.*

**Mockingbirds in Panama.**—In January 1938, with Dr. Herbert Clark, I saw two mockingbirds, apparently a pair, in the grounds of the Gorgas Memorial Institute, Panama City. About a month later I again saw two mockingbirds, also a pair, but presumably not the Memorial Institute pair, on the hillside between the Balboa railway station and the Zone Administration Building. In February 1939, Dr. Troy W. Earhart wrote me that mockingbirds were nesting near the Ancon tennis court, and in July of that year Mrs. Gladys C. Barnard reported their breeding at Pedro Miguel in 1938 and also in 1939. Adding to these definite records several rumored occurrences it seems evident that the mockingbird is becoming established in the Zone.

Apparently no form of mockingbird has been recorded from the Republic of Panama, nor is it contained in Mrs. Sturgis's 'Birds of the Panama Canal Zone' which is based on published papers as well as on her own observations. Since it is inconceivable that the author of this volume during her several-years' residence in the Zone could have overlooked so conspicuous a species as a mockingbird, we conclude that the bird has reached the Zone since the publication of her work in 1928.

It remained now to discover what manner of mockingbird had made the Zone its home. This could be done only by examination of specimens. These were subsequently supplied by Dr. Earhart with the assurance that their capture would in no way endanger the continued existence of the species in the Zone. These specimens show that the Zone bird is not referable to the North American *Mimus polyglottos* but to the Venezuelan *Mimus gilvus melanopterus*, the Black-winged Mockingbird. Only one form of this species is known from Venezuela, but in Colombia a larger race (*M. g. tolimensis*) occupies the upper Magdalena Valley

and contiguous areas while a smaller, paler race (*M. g. leucopterus*) with the outer web of the outer pair of rectrices usually wholly white, is found on the coast at Santa Marta and west at least to Baranquilla. Dr. Hellmayr refers these birds to *melanopterus*, but I agree with Mr. Todd that they constitute a well-marked race. On the other hand, I agree with Dr. Hellmayr, and not with Mr. Todd, that *melanopterus* Lawrence (1849) and not *columbianus* Cabanis (1851) should be used for the Venezuelan bird. Dr. Hellmayr, who has examined Cabanis's two specimens, states that both are marked "Venezuela" and agree with Venezuelan skins.

The standing of the mockingbirds from the Cartagena-Atrato region has not been satisfactorily determined. The few specimens available agree in size with the Venezuela form and hence should be referred to *melanopterus* rather than to *tolimensis*. Their identification is of importance in an attempt to learn the geographic origin of the Canal Zone birds. If their presence in and near the Zone is due to an actual extension of the range of the species we should look to northwestern Colombia, rather than to Venezuela, for the ancestors of the Zone birds.

It is by no means certain, however, that the mockingbird has reached Panama under natural conditions. It is true that the distribution of the species in Central America is irregular and inexplicable. It is unrecorded, for example, from the area between the Canal Zone and Honduras and Salvador, and it would not, therefore, be surprising if it were also missing from the largely forested country lying between the Zone and northern Colombia.

But with a bird so often held in captivity one must consider the possibility of its descent from escaped caged birds. Large numbers of native wild birds are shipped from northern South American ports and it is more than probable that some of them reach the Canal Zone. From a number of sources I have heard of a cageful of mockingbirds that escaped from a steamer passing through the Zone. Whence they came is not stated.

More definite is the information received from Mrs. Bryan, well-known aviculturist of Ancon, that several mockingbirds have escaped from her aviaries. Here, also, their source is unknown though the odds are all in favor of Venezuela or Colombia. Of the two, the theory of accidental introduction seems to me to be more acceptable than that of normal extension of range. Possibly some reader of this note may be able to contribute to this first chapter of the mockingbird's history in the Canal Zone. In any event, the future history of this important addition to the Zone's avifauna should be closely observed and recorded.—FRANK M. CHAPMAN, *American Museum of Natural History, New York City.*

**Brown Thrasher in Oregon.**—On August 20, 1940, while studying the wealth of bird life in and around Klamath Lake, Oregon, I was surprised to discover in some shrubbery in the plain at the north end of the upper marshes, a Brown Thrasher, *Toxostoma rufum*. The bird was but a few yards distant and the reddish-brown plumage, slightly curved bill, yellow iris and long tail were plainly visible. I am thoroughly familiar with the bird in the East but offer no opinion as to subspecific form, assuming Oberholser's form, "*longicauda*," is accepted. Location is such that the western form seems the more probable one. The bird was also seen by my wife and son, who are well acquainted with the bird in the East and by Mrs. Lydia M. Moore and Miss Bertha F. Comings, now of Eugene, Oregon, but formerly of Newport, Vermont, and Holyoke, Massachusetts, where they learned to recognize the bird.

The Brown Thrasher was reported in Altadena, California, by van Rossem (Condor, 35: 161, 1933); at Zion Canyon, Utah, by H. Grantham (Condor, 38: 85, 1936); and near Albuquerque, New Mexico, by A. E. Borell (Condor, 41: 259, 1939).—AARON C. BAGG, 72 Fairfield Ave., Holyoke, Massachusetts.

**Two Yellow Warblers new to Massachusetts.**—For years I have wondered whether the occasional Yellow Warblers seen on migration in September long after the breeding birds have departed would not prove to be the perfectly valid Newfoundland subspecies *amnicola* Batchelder, if collected and properly compared. Two late specimens most judiciously collected at Jackman, Maine, by Mr. Allan R. Phillips in 1937 validated the first record of this subspecies for New England. My own opportunity came on September 7, 1940. On Monomoy Peninsula, Cape Cod, Massachusetts, there is a small clump of poplars near a camp in a dune hollow about one-third of the way to the Point, known to local students as the 'oasis,' because of the astonishing number and variety of land-bird migrants that can be found there. On September 7, two Yellow Warblers appeared here, the first I had seen in three weeks. I accordingly looked at them with the greatest care, and the moment I noticed that one was obviously greener than the other it was promptly shot, and proved to be a most typical adult female *Dendroica aestiva amnicola*, the first recorded for the State. Continuing to beat the thicket, I was surprised to see two more Yellow Warblers. One of these was so much greener and duller than the one I had just shot, that I was strongly reminded of similar-looking birds in Nicaragua, that had proved to be the Alaskan *Dendroica aestiva rubiginosa*. So the second green Yellow Warbler was also shot, and proves to be an extremely dull and green immature Alaskan Yellow Warbler. This is apparently the first record of this race for the Atlantic seaboard, but others may be found when migrant specimens are critically determined in innumerable collections, instead of being assumed to belong to the local breeding form.

I am entirely aware that Oberholser (Birds of Louisiana, p. 530, 1938) has recently commented on the characters of *amnicola* and claims that all breeding birds of northern Canada belong here. He is probably correct in both taxonomy and nomenclature, but the subject still requires proper elucidation. This race is now reported from Maine, Massachusetts, the District of Columbia, Louisiana and New Mexico, and I recorded it from eastern Guatemala in 1932.—LUDLOW GRISCOM, Museum of Comparative Zoology, Cambridge, Massachusetts.

**Kentucky Warbler in Massachusetts.**—On May 23, 1940, I went to the peninsula of Nahant in Essex County, Massachusetts, a natural trap for land-bird migrants. At the first stop the song of a Kentucky Warbler (*Oporornis formosus*) burst on my astonished ear through the windows of the car, before I had had time to turn off the motor. The bird was immediately located and seen to excellent advantage, and as is often the case with this species, was almost incessantly in song. Well aware that there was no specimen from the State, I next sought corroboration. Advised by telephone, Mr. S. G. Emilio started from Salem and Mr. David L. Garrison from the Boston Society of Natural History, and both gentlemen saw the bird perfectly an hour later. In the meantime I called upon Chief of Police Lamphier, who very obligingly waived a fifty-year rule and gave me special permission to collect the bird for the Peabody Museum of Salem, where it is now mounted and on permanent exhibit. His courtesy is here warmly acknowledged.

There have been various reports of the Kentucky Warbler seen in this State,

always by a single observer, never previously acquainted with this species in life in its proper range. Of the reports given by Forbush, the first two can scarcely be questioned, as the observations are recorded in detail and were made by observers of known competence and experience. Messrs. Bagg and Eliot publish another (Birds of Connecticut Valley, p. 525, 1937) from Northampton, May 17, 1936, where the detailed account with a drawing was even more convincing than their summary of it. The other reports in both books can scarcely be regarded as certainties or real additions to scientific knowledge. One or more may be possible or even probable, but this is a matter for speculation only. At present the Kentucky Warbler is proved to be a very rare spring vagrant north of its breeding range. Sight records in New England by inexperienced observers in midsummer and fall require confirmation.—LUDLOW GRISCOM, *Museum of Comparative Zoology, Cambridge, Massachusetts.*

**Hooded Warbler flying backward.**—In view of meager data hitherto presented regarding backward flight in birds, the fact is considered noteworthy that late in August 1940, the writer watched a male Hooded Warbler (*Wilsonia citrina*) in an act resorted to by very few avian species. The bird under observation, in a damp, shady thicket, was accompanied by a Kentucky Warbler (*Oporornis formosus*), the latter being extremely sedentary in comparison. With tremulous wings and "flashing" tail-feathers, the hooded creature moved about restlessly. Presently, at a height of five or six feet, it was momentarily seen to float downward and backward at an approximate 50° angle, fluttering tail-first with its body parallel to the oblique direction of flight. It has not been determined whether a desired insect, an aberrant impulse, or merely pent-up energy was responsible for this unusual feat. The lighting and distance were favorable, and the only obstruction was a slight wisp of hanging vine.

Although this individual scarcely suggested the dexterity of a hummingbird, it is believed that the radical ability is there but is not realized since the warbler seldom has occasion to exercise it. Apparently, but one other recently published account has disproved the general belief of the hummingbird's sole ability in this respect (cf. Williams, Auk, 57: 255, 1940).—ROBERT NORRIS, *Fitzgerald, Georgia.*

**Hooded Oriole again recorded in the United States.**—During the course of field work in Texas this past spring (1939) a limited amount of collecting was carried on at the mouth of the Pecos River, approximately forty miles northwest of Del Rio, Val Verde County. Among the birds taken there on April 25 was a male Hooded Oriole, that was later found to represent the Mexican race, *Icterus cucullatus cucullatus* Swainson. Until taken by Dr. George M. Sutton near Marathon, Brewster County, Texas, on April 17, 1935 (J. Van Tyne and G. M. Sutton, *Miscell. Publ. Mus. Zool., Univ. Michigan*, no. 37: 92, 1937) this race had not heretofore been recorded from the United States. This appears, therefore, to be the second record for this subspecies north of the Rio Grande. It is possible that further field work will reveal this oriole as of more than casual occurrence within the United States.—THOMAS D. BURLEIGH, *Bureau of Biological Survey*, and GEORGE H. LOWERY, JR., *Louisiana State University, Baton Rouge, Louisiana.*

**Cowbird on the Virginia and North Carolina coasts.**—The breeding range of the Eastern Cowbird (*Molothrus ater ater*) as usually given does not include eastern



Virginia or North Carolina. The following records may thus be of some interest. The writers saw a flock of nine Cowbirds, mostly males, at the Virginia National Guard Camp, just south of Virginia Beach, Princess Anne County, Virginia, on May 22, 1940. Courtship display was in progress. This and the date seem to indicate that the birds were breeding there. The Rev. F. H. Craighill, of Rocky Mount, North Carolina, informs us that he saw two males between Jamestown and Williamsburg, Virginia, on May 30, 1940. For the North Carolina coast Mr. Craighill has furnished us with several records: Bodie Island, June 27, 1936, one brown-headed male; Roanoke Island, June 28, 1936, several small flocks (of ten to fifteen birds), mostly young birds but some adults; Roanoke Island, June 8, 1937, fifteen at Manteo, including brown-headed males; Roanoke Island, June 1, 1938, adult male and female.—JOHN H. GREY, JR., Raleigh, North Carolina, and J. J. MURRAY, Lexington, Virginia.

**'Anting' by Summer Tanager.**—"Anting" by the Song Sparrow" in the October 'Auk' recalls a Summer Tanager (*Piranga rubra rubra*) which I observed 'anting' on September 26, 1938, at my home in North Little Rock, Arkansas; I trapped and banded the bird while it was engaged in this curious performance. It had come to a table on which, all summer, I had kept a small cup of sweetened water for Orchard Orioles, and, after their departure, for the occasional Mockingbird or Tufted Titmouse with a taste for sweets. The cup was nearly empty and, I had noticed a short time before, swarming with red ants. The tanager, squatted on the table, slid back and forth in the most grotesque way, its tail often bent beneath its body. It continually picked at feet and legs, worked under its wings with its beak, then shook out all its feathers. A second tanager flew to the edge of the table, but was driven off by the first. Then the 'anting' tanager thrust its beak into the cup of ants, next plunged its head under a wing. It seemed, from a distance, to be stowing the ants away. Close to the cup was a one-cell trap, Potter type, baited with peanuts; and this bird, as if on sudden impulse, ran into the trap. I examined it at once, but could find no ants in its plumage, although on the table were many maimed and writhing ants. The tanager was an immature male, with a few red feathers showing in the olive-green, and was given the band no. 138-109010.—RUTH HARRIS THOMAS, Route 4, North Little Rock, Arkansas.

**Rufous-crowned Sparrow of southeastern New Mexico.**—Brodrick (Auk, 57: 421-422, 1940) records a Rufous-crowned Sparrow from Carlsbad Caverns National Park, New Mexico, which I had identified for him as *Aimophila ruficeps eremoeca*. After reporting to him, there came to hand the description by Burleigh and Lowery (Occas. Papers Mus. Zool., Louisiana State Univ., no. 6: 67-68, 1939) of a new race of this species from the adjacent Guadalupe Mountain section of Texas. This description of *A. r. tenuirostra* served to clear up certain discrepancies between the Carlsbad specimen and typical *eremoeca* that I had noted, and shows that the former belongs to the rather distinctive new race. The Carlsbad specimen (no. 79190, Mus. Vert. Zool.) has the dark coloration and slender, less conical bill of *tenuirostra*. The bill is, however, as long and massive otherwise as in our specimens of *eremoeca* and *scotti*. Because we were unaware that Mr. Brodrick planned to record this specimen immediately, word of our revised opinion concerning identity unfortunately was not sent to him prior to the publication of his note.—ALDEN H. MILLER, Museum of Vertebrate Zoology, Berkeley, California.



**Bachman's Sparrow in New York.**—On May 8–12, 1940 (inclusive), I observed a Bachman's Sparrow (*Aimophila aestivalis bachmani*) at Mendon Ponds Park, Monroe County, New York. This apparently constitutes the first record of this species for New York State. The circumstances of the observation were as follows. The bird was found on a hillside clearing overgrown with meadow grasses and scattered small aspens and conifers. On three sides the clearing is bordered by heavy deciduous woodland, on the fourth by a swampy, brush-covered area. As I entered this clearing at 6.00 a. m., May 8, 1940, I heard a song of unusual beauty which was entirely new to me in twenty years of observation in this region. It resembled in phraseology the songs of both the Field Sparrow and the Towhee, but in quality, especially of the first reed-like phrase, it was suggestive of the songs of the thrushes. A phonetic description is approximated by *g-r-r-e-e-e-en* (usually crescendo and reed-like), *back* (lower pitch), *tur-tle, tur-tle, tur-tle* (clear, full, vigorous, and fairly rapid). This was the usual song, but there was an occasional variation in phrasing, pitch, and completeness. The bird was heard singing daily between 5.30 and 7.00 a. m., once at midday, and once in the late afternoon. Delivery usually took place from the top of one of the small aspens or conifers with head thrown back and bill wide open, pointing straight up.

When seen on May 8, a tentative identification as Bachman's Sparrow was made on the basis of the plain-buffy breast and flanks, grayish auricular area, reddish-brown nape and the song. On subsequent observations the bird was compared carefully with textual descriptions and (in the field) with a series of six skins of the Pine-woods Sparrow (*Aimophila aestivalis aestivalis*) loaned by Ward's Natural Science Establishment. No *bachmani* skins were available, but the bird under observation was generally lighter and browner than the *aestivalis* specimens. Confirmation of identification was also made by Mr. Fred Hall, of Ward's Museum, who was previously familiar with the bird in Tennessee. Five other experienced members of the Genesee Ornithological Society (Rochester) observed the bird and concurred in the identification. During the five days the bird was under observation for periods of one-half to one and one-half hours under all conditions of light and at distances of twenty to eight feet with 8-power binoculars and 15-power telescope, and from all angles.

The bird's behavior was distinctive. When first seen each day, the bird was always on the top of a small aspen or conifer. There it would remain, singing at ten- to thirty-second intervals, until approached too closely or rapidly when it would stop singing, become uneasy, and then would dart down with a very shallowly undulating flight into the grass or low branches of a conifer. When found again and flushed, there would be a short low flight and another drop into the grass. After a waiting interval it would again take an elevated perch and resume singing.

The description of the bird as finally compiled from field observations was as follows. Completely unmarked under parts with breast, upper belly and flanks definitely yellowish buff; throat grayish with trace of buff; rest of under parts grayish white; crown reddish brown with suggestion of a gray center stripe; supraocular line buffy; nape longitudinally striped with gray and reddish brown (lighter than crown); auricular area buffy gray with apparently a fine line of brown through it; back and rump streaked with black, brown and gray; secondaries and wing-coverts chestnut brown, primaries blackish brown. I was unable

to see any yellow at bend of wing. Tail about same color as primaries; bill of typical sparrow form, dark horn color; feet and legs yellowish.

Although sufficient opportunity existed, the bird was not collected, as no permit was available. The record is, therefore, submitted as a visual one for whatever value it may have.—GORDON M. MEADE, M.D., *Strong Memorial Hospital, Rochester, New York.*

**Gambel's Sparrow in Pennsylvania.**—On April 17, 1940, one of my assistant bird-banders, Mr. Guy L. Bomberger, of Lititz, Pennsylvania, called me to his station to verify the identification of a Gambel's Sparrow, *Zonotrichia leucophrys gambeli*, which he had trapped that day. I photographed the living bird at a distance of eight inches (see figure on Plate 4) and on the following day compared the photographs with skins of this race at the Reading Museum. Dr. Earle L. Poole, director of the Museum, agreed with me in its identification. Though reported from South Carolina and from Massachusetts, this appears to be the first record for Pennsylvania. Unfortunately the bird escaped before it could be banded. Notable is the early date of its appearance in contrast to the usual dates for the White-crowned Sparrow (*Zonotrichia leucophrys*), which arrives with us in early May. The first record this year (1940) was May 7, and there seems to have been an unusually large flight in the next three days, during which we trapped five, and another observer reported seeing at least twenty-five individuals within a few hours.—BARTON L. SHARP, 201 North Broad St., Lititz, Pennsylvania.

**Termites taken by birds.**—Although countless thousands of winged, swarming termites must be eaten each year in North America by individuals of a good many species of birds, actual observations of the phenomenon appear to be very rare. There seem to be only two such records in the literature, both more than sixty years old. Baron Osten-Sacken (Proc. Boston Soc. Nat. Hist., 19: 72, 1877) in the early summer of 1876 in California saw bluebirds (presumably *Sialia mexicana occidentalis*) feeding on winged examples of what must have been *Zootermopsis nevadensis*. Hagen (ibid., 20: 118, 1878) relates that an observer in Cambridge, Massachusetts, saw Robins, Bluebirds, and other unnamed birds feeding upon a swarm of *Reticulitermes flavipes*. On May 30, 1940, at Lincoln, Massachusetts, I saw *R. flavipes* taken by *Iridoprocne bicolor*, *Hirundo erythrogaster*, *Dendroica striata*, and *Setophaga ruticilla*. In the same locality on June 2, the same termite was taken by *Tyrannus tyrannus*, *Dumetella carolinensis*, and *Melospiza melodia melodia*. It should be noted that the cases here detailed are (with one exception) the only published ones in which the identity of the termites is clearly evident. From Snyder (U. S. Dept. Agric., Bull. 333: 9, 1916), Cottam and Knappen (Auk, 56: 138-169, 1939) and Bent (Bull. U. S. Nat. Mus., no. 176: 242, 265, 1940) I list the other American birds known to feed on termites: *Aix sponsa*, *Chordeiles minor hesperis*, *Nephoecetes niger borealis*, *Chaetura pelagica*, *Colaptes auratus*, *C. cafer*, *C. chrysoides mearnsi*, *Ceophloeus pileatus*, *Dryobates villosus*, *D. pubescens*, *D. nuttalli*, *D. borealis*, *Tyrannus vociferans*, *Myiarchus tuberculifer olivascens*, *Sayornis nigricans nigricans*, *Myiochanes richardsoni richardsoni*, *Otocoris alpestris*, *Riparia riparia riparia*, *Thryothorus ludovicianus*, *Mimus polyglottos*, *Toxostoma longirostre sennetti*, *Hylocichla mustelina*, *Sturnella* sp., *Piranga erythromelas*, *Aimophila botterii botterii*.—CHARLES H. BLAKE, Lincoln, Massachusetts.

**Early nesting at Cape Sable, Florida.**—Cape Sable, in Monroe County, lies at the southern tip of the Florida peninsula and is the most southern point (excluding the Florida Keys) in the United States. It is well known that the breeding season of the birds of this region varies considerably from year to year, and that most species nest earlier there than in more northern parts of their range. The only settlement on the Cape is Flamingo (at about 25° north latitude) and often no one lives in any of its half-dozen houses.

On December 26, 1933, Douglas S. Riggs, J. Adger Smyth and the writer visited Alligator Lake, which is about five miles west of Flamingo. Here we discovered a colony of about five hundred pairs of Wood Ibis (*Mycteria americana*) nesting in both living and dead red mangroves (*Rhizophora mangle*), mainly along the southern edge of this small, shallow, salty lake. The nests were placed from three to thirty feet over water that was only a few inches deep. Exceptionally large clutches were the rule this season, for of the two hundred nests examined the majority contained four eggs and five nests held five eggs each. No young were seen but some of the eggs were at least two weeks advanced in incubation. Fifteen Roseate Spoonbills (*Ajaia ajaja*) were observed in the rookery. One of them seemed to have a nest as it alighted fifty feet away and gave a few low, guttural quacks. No nest was located, however. A Black-crowned Night Heron's (*Nycticorax n. hoactli*) nest, containing a single fresh egg, was examined. Two Florida Cormorants (*Phalacrocorax auritus floridanus*) were flushed from fresh, completely built, but empty nests. The nest of a Southern Bald Eagle (*Haliaeetus l. leucocephalus*), located eight miles west of Flamingo, was examined on this date and found to contain a single fresh egg. The nest was twenty-five feet up in a black mangrove (*Avicennia nitida*).

Palm Key, which lies in Florida Bay about five miles offshore to the east of Flamingo, was searched for interesting birds on December 31, 1934, by the party mentioned above. Four nests of the Osprey (*Pandion haliaëtus carolinensis*) were examined and each held three eggs. The nest-stained condition of one of these sets of eggs indicated that incubation was well advanced. All of these nests were in black-mangrove trees. Young birds of the following species were banded: Great White Heron (*Ardea occidentalis*), Florida Cormorant, Ward's Heron (*Ardea herodias wardi*), and Eastern Brown Pelican (*Pelecanus o. occidentalis*).

On December 28, 1936, Harry Roberts took a party composed of Edward M. Davis, John Fluno, Douglas S. Riggs and the writer, in his launch east from Flamingo to Dildo Key—a distance of about eight miles. Nesting on this key were 250 pairs of Black-crowned Night Herons, twenty pairs of American Egrets (*Casmerodius albus egretta*), at least one pair of Great White Herons and a pair of Southern Bald Eagles. The night heron's breeding season was at its height. A few nests were just being constructed and many young were already on the wing. A few nests were built on the ground (often under a rather dense bush or clump of grass) and others were as much as five feet up; twenty-six were more than two feet above ground while thirty-five were less. Sixty-one nests were examined. Of these, one was empty but newly built; five contained two eggs each; eight held three eggs each; one held four eggs; five held one young each; fifteen held two young, thirteen contained three young; and thirteen were empty but recently had held eggs or young. Evidently nesting had started in early November and perhaps some eggs were laid in late October. A. H.

Howell, in 'Florida Bird Life' (1932: 109) states that nesting "apparently begins in December in southern Florida." A number of dead young night herons were found in and under the nests. None of these young had been torn up by predatory mammals or birds, indicating that few natural enemies of these birds were present on the island.

Seventeen nests of the American Egret were examined, of which two were recently completed but empty; one contained a single egg; five had two eggs each; and nine held three eggs each. No young egrets were observed. The egrets' nests were placed higher on the average than those of the night herons. The plumes of the egrets were well developed. Howell, in the work cited above, gives only a single record of this species nesting as early as December. He reports a set of eggs taken at Lake Jessup, Florida, on December 8, 1859.—JOSEPH C. HOWELL, *Cornell University, Ithaca, New York.*

**Unusual North Carolina records.**—In 'The Chat' (Bulletin of the North Carolina Bird Club) of January 1940, the Reverend John H. Grey, its editor, had a paper on 'Unusual [North Carolina] Records in 1939.' As 'The Chat' has a small and mostly local distribution, I secured Mr. Grey's permission to present to 'The Auk' in condensed form such of these records as seem to be of more than local interest, with some additional notes by myself.

**AUDUBON'S SHEARWATER, *Puffinus l. lherminieri*.**—Unusually plentiful—for the species. Observed by Churchill Bragaw off the mouth of the Cape Fear River on July 23, 1939. Walker found them on Pea Island on July 21, 28, 29, and August 20, 1939, and three were identified near Oregon Inlet on August 17. Walker also reported eight at Oregon Inlet on July 27, 1938, and found seventeen dead in one day along the beach, none being oil-soaked.

**GREATER SHEARWATER, *Puffinus gravis*.**—S. A. Walker and T. Gilbert Pearson picked up a dead bird on Currituck Beach and Walker found another on Bodie Island Beach on June 26, 1939.

**YELLOW-BILLED TROPIC-BIRD, *Phaethon lepturus catesbyi*.**—A specimen was picked up dead by Walker on the north shore of Oregon Inlet on July 5, 1939.

**WHITE-FRONTED GOOSE, *Anser a. albifrons*.**—One was observed by S. A. Walker on the Pea Island Refuge on February 2, 6, 7, 21, and March 5, 1939. He had also identified a single bird on January 19, 1938.

**BLUE GOOSE, *Chen caerulescens*.**—Observed by Walker on Pea Island from November 2, 1937, to February 9, 1938; a flock of thirteen was seen on February 8. Our earliest record for the species is October 18, 1939, by Walker. Since 1927, this species seems to have become a regular winter visitor on Pea Island, though in comparatively small numbers.

An immature specimen was recorded by Theodore Empie, of Wilmington, North Carolina, as taken a few miles west of the mouth of the Cape Fear River, on November 18, 1939, our farthest southerly record for North Carolina.

**GADWALL, *Chaulelasmus streperus*.**—Our first record of this species breeding in the State is by Walker, who found an adult accompanied by ten young on one of the Pea Island Refuge ponds, on June 12, 1939. The family was again seen on July 26, when one young was caught and banded.

**FLORIDA RED-TAILED HAWK, *Buteo borealis umbrinus*.**—A new form for the State list. Reverend Dr. F. H. Craighill, of Rocky Mount, secured two specimens taken near Nashville, North Carolina, one in January 1939, and the other some two years earlier. Dr. H. C. Oberholser upheld Craighill's tentative identification and stated that these were the first satisfactory records of this form outside of Florida.

MARbled GODWIT, *Limosa fedoa*.—A flock of twenty-one was observed on Pea Island, December 26, 1939, by S. A. Walker, Mrs. A. C. Reed, of Norfolk, and John H. Grey. The birds were watched for more than half an hour both in the air and on the mudflats, at times within a hundred yards of the observers.

AVOCET, *Recurvirostra americana*.—One was observed on September 8, 1939, both in the air and on the beach at Nag's Head Coast Guard Station, at close range by F. H. Craighill and S. A. Walker. Another was seen the same day just over the Virginia line.

RED PHALAROPE, *Phalaropus fulicarius*.—One was picked up dead on November 16, 1939, by Craighill, near Rocky Mount, but it was too far advanced in decomposition to be preserved.

ROSEATE TERN, *Sterna d. dougalli*.—An adult female was taken August 17, 1939, and an adult male the following day, by Mrs. Roxie Collie Simpson and J. H. Grey, at Oregon Inlet. Walker reported these rare terns on July 4 and 7, August 26 and September 8, 1938. Walker and Craighill report the species as fairly common on Pea Island from August 28 through September 8, 1939.

DOVEKIE, *Alle alle*. BY H. H. BRIMLEY.—A number of reports show that Dovekies were abundant in the waters adjacent to Beaufort and Morehead City, around Buxton (which is the post office for the Cape Hatteras region), at New River Inlet, Onslow County, and up Core Sound. The earliest dates were November 8, at Buxton, and November 24 at Morehead. In the neighborhood of the mouth of the Cape Fear River several specimens were secured but I have no record of their abundance in those waters, and I have had few reports of their occurrence as far north as Pea Island. They were recorded as common at Buxton through February 1940.

SAW-WHET OWL, *Cryptoglaux a. acadica*.—A much-emaciated male was picked up dead in Oakwood Cemetery, Raleigh, on December 6, 1939. Its gross weight was one ounce and three-fourths.

A male hybrid, BLACK DUCK and MALLARD, was received in the flesh at the State Museum on December 6, 1939. It had been taken by T. G. Samworth, near the mouth of New River a day or two previously. This closes the items from 'The Chat.'

WHITE PELICAN, *Pelecanus erythrorhynchos*.—One was observed by Earle R. Greene on Lake Mattamuskeet on June 16, 1935 (Report to the U. S. Bureau of Biological Survey, 1935).

WOOD IBIS, *Mycteria americana*.—Seven of these birds were reported by James L. Stevens, of the State Department of Conservation, on Lennon's Mill Pond, Robeson County, on August 7, 1939.

EASTERN GLOSSY IBIS, *Plegadis f. falcinellus*.—A bird was observed on Pea Island by S. A. Walker, April 20, 1939. An immature female was received in the flesh at the State Museum on February 9, 1940. This specimen was taken in the upper part of Core Sound a few days previous to its receipt here. This is the first record accompanied by a specimen of this species for North Carolina.

WHITE IBIS, *Guara alba*.—An immature bird was seen on two occasions by T. G. Samworth near New River Inlet on August 10, 1939. It was observed with a strong binocular while perched on a small cedar, at about fifty yards distance.

MALLARD, *Anas platyrhynchos*.—On June 20, 1935, a nest containing five eggs was found on Lake Mattamuskeet by Earle R. Greene (Report to the Bureau of Biological Survey, 1935).



**BLACK DUCK, *Anas rubripes*.**—Four adults, each accompanied by downy young, were observed on the fresh-water ponds at Pea Island on June 20, 1939, by T. Gilbert Pearson, S. A. Walker and the writer. An adult, with seven or eight young was seen on Lake Mattamuskeet, June 19, 1935, by Earle R. Greene (Report to the Bureau of Biological Survey, 1935).

**EUROPEAN WIDGEON, *Mareca penelope*.**—One was seen by S. A. Walker on Pea Island, March 9, 1939.

**AMERICAN MERGANSER, *Mergus merganser americanus*.**—In a letter dated February 9, 1939, Mr. Rupert West of Moyock, North Carolina, informed me that during the last week in May 1938, he viewed at close quarters a pair of adult American Mergansers, accompanied by five downy young, on Bennett's Pond, Chowan County, our first record of this species breeding in North Carolina.

**MARSH HAWK, *Circus hudsonius*.**—A nest containing four eggs was found on King's Point, about six miles northwest of the Cape Hatteras Park, on May 20, 1936 (Edwin L. Green: The Chat, January, 1939). This seems to be our first definite record of the nesting of this species in this State.

**EASTERN DOWITCHER, *Limnodromus g. griseus*.**—A single bird was observed by T. Gilbert Pearson, S. A. Walker and the writer on the 'lumps' off Buxton, June 20, 1939.

**BLACK SKIMMER, *Rynchops n. nigra*.**—Mrs. Roxie Collie Simpson reports large flocks (thousands of individuals in the aggregate) in Beaufort Harbor on December 15, 1939. On a later visit, from January 14 to 20, 1940, Mrs. Simpson states that none was to be seen in the same area.

Grover Quinn, in a letter to C. S. Brimley, under date of February 16, 1940, states that he found a dead bird on the sound shore at Buxton on January 24, 1940, and that he observed about fifty live skimmers during the day. These seem to be new winter records for the species, at least in large numbers.

**BLACK AND WHITE WARBLER, *Mniotilta varia*.**—On May 14, 1933, Mr. and Mrs. Edwin Clarkson found a nest of this species about five miles southeast of the center of Charlotte, North Carolina, and about 300 yards from their home. It occupied a typical situation and contained four almost fully feathered young. One week later the young had left the nest which was collected for examination. There was no particular departure from normal in its construction except for the fact that it was lined with a mixture of fine rootlets and *very fine copper wire*, such as is used in telephone cables. Fragments of such cable, discarded by repair men, were found nearby where a telephone line ran through the woods. Mrs. Clarkson kindly sent us the nest for examination and there is no doubt of its lining being composed of rootlets and fine copper wire woven together.

**EASTERN LARK SPARROW, *Chondestes g. grammacus*.**—On Pea Island, S. A. Walker observed an individual a number of times from January 13 to March 31, 1939.

**EASTERN SNOW BUNTING, *Plectrophenax n. nivalis*.**—A flock of about 75 was observed by Mrs. Roxie Collie Simpson, at Beaufort, on December 11, 1939.—H. H. BRIMLEY, State Museum, Raleigh, North Carolina.

**Notes from Princess Anne County, Virginia.**—The writers made a brief trip on May 20–22, 1940, to this border-line region in order to secure a few birds for subspecific identification. All specimens referred to below were kindly identified for us by Dr. Alexander Wetmore. Certain other observations of some interest were made.

**PARASITIC (?) JAEGER, *Stercorarius* sp.**—A jaeger in light phase and probably of

this species was seen over the surf at Sand Bridge, near the head of Back Bay, on May 22. As rain clouded our view and as neither of us is very familiar with jaegers the specific identification is somewhat doubtful, but the occurrence of any jaeger on the Virginia beaches is of interest.

**LAUGHING GULL, *Larus atricilla*.**—On May 22, we watched a flock of some fifty birds at Lynnhaven Inlet, nearly all of which were definitely paired off. Courtship activity was in full swing, the females generally taking the initiative, sidling up to the males and continually throwing their heads up with a jerking motion. There was some fighting among males. A few pairs were seen copulating, the females standing erect on the sand at the time. The nearest breeding grounds known to us are Cobb's Island, forty miles north, and Pea Island, eighty or more miles south.

**SOUTHERN FLICKER, *Colaptes auratus auratus*.**—A male taken at Ocean View, just outside the Norfolk city limits, on May 20, turns out to be this subspecies. It accordingly represents an addition to the Virginia list.

**EASTERN MEADOWLARK, *Sturnella magna magna*.**—A female taken at Ocean View on May 20 has been identified as *magna*. The southern limit of the range of this form cannot be far from this point, since *argutula* breeds in eastern North Carolina. Meadowlarks were found to be fairly common not only in meadows and pastures but also in the coarse grass of the open pine woods.

**ATLANTIC SONG SPARROW, *Melospiza melodia atlantica*.**—Two males were collected, one at Ocean View on May 21, the other on May 22 at Sand Bridge Beach, near Pungo. Both were taken among the myrtles on the sand dunes back of the beaches. The bird was abundant in such locations. Some had young on the wing. We also found them at other places in this region in thickets along salt marshes, but never very far from open salt water. We thought that we could distinguish the song of this race from that of *melodia*, altogether apart from individual variation, by a buzzing quality, definitely reminiscent of the song of the Bewick's Wren.—J. J. MURRAY, Lexington, Virginia, and JOHN H. GREY, Raleigh, North Carolina.

**Some West Indian birds' eggs.**—Since publication of my 'Birds of the West Indies' I have received the following information on eggs of certain Antillean species for which I am indebted to the following gentlemen: Mr. George D. Smooker of Trinidad, B. W. I., Dr. Ermanno Ciferri of Pavia, Italy, Sr. José Hernández Bauzá of Havana, Cuba, and Mr. James Gillin of Ambler, Pennsylvania.

***Geotrygon versicolor*.**—Two eggs of this dove, apparently laid by a captive bird in Kingston, Jamaica, measure 32.8 by 24.3, 32.9 by 25.3 mm., respectively. In color they are ochraceous buff, resembling eggs of the widespread *Oreopeleia montana* but are much larger. This set is now in the collection of James Gillin of Ambler, Pennsylvania.

***Amazona collari*.**—A set of four eggs of this parrot in the Smooker Collection (Trinidad) measure 35 by 29.5, 36 by 28, 36 by 29.6, 35.8 by 30 mm., respectively.

***Asio flammeus dominicensis*.**—An egg of this owl, sent to me by Dr. Ciferri from the Dominican Republic, measures 41.6 by 32.4 mm.

***Corvus jamaicensis*.**—Two sets of eggs of this crow, containing four and three eggs, respectively, are in the Smooker Collection. These eggs are pale green, densely spotted with different shades of grayish brown, the markings heaviest at the larger ends (45.5 by 29.6, 45.8 by 29.9, 45.5 by 29.5, 44.5 by 29.6 mm.; 43 by 28.8, 41.9 by 28.9, 44 by 28.9 mm.). They closely resemble eggs of the common crows of Europe and America.

*Textor cucullatus cucullatus*.—Sets in the Smooker Collection, taken in Haiti, contain from two to four eggs. Six of these eggs are immaculate, whereas three are spotted. They average about 23.5 by 16.5 mm.

*Tyrannus cubensis*.—A nest of this species was found by Sr. José Bauzá near Havana. This was taken on May 28, 1939, after great difficulty, together with a set of three eggs. The nest was situated at the top of a large ceiba tree. Both nest and eggs resemble those of *T. dominicensis* but the eggs are much larger. They are pale pinkish buff spotted with brown and to a lesser extent with lavender gray, the markings forming a well-defined wreath about the larger ends (30 by 21, 30.5 by 21, 31 by 21 mm.).—JAMES BOND, *Academy of Natural Sciences, Philadelphia, Pennsylvania*.

## RECENT LITERATURE

**Bent's 'Life Histories of North American Birds.'**<sup>1</sup>—This latest volume<sup>1</sup> of the celebrated 'Life Histories' contains the available information concerning 59 forms of parrots, cuckoos, trogons, kingfishers, goatsuckers, swifts, and hummingbirds. It follows the same plan as the previous issues, treating each species or subspecies under the topics of spring, courtship, nesting, eggs, young, plumage, food, behavior, voice, enemies, autumn, field marks, and distribution. For many species information is not available concerning various topics. Taxonomic problems are not considered.

The biographies of the several species mention many interesting facts. The discussion of the Carolina Parakeet points out the destructive feeding habits of the birds and, important in comparison with other kinds of parakeets, the probability that our species nested in colonies, sometimes apparently building large nests of sticks. There is also a short discussion of the Mexican parrot, *Rhynchopsitta*. The chapters on the two species of Ani and the Roadrunner abstract most of the available information although several references are omitted. For example, Gundlach long ago (1874) exploded the myth that the Anis lay their eggs in layers; Chapman (1938) wrote an accurate chapter on *Crotophaga ani* and Hartley (1917) studied its development. Our two North American cuckoos are discussed at length. However, the classic work of Herrick (1910) is not mentioned, although some of his extensive data are contained in the 1935 reference. The life histories of two Asiatic cuckoos by E. C. S. Baker contain much unpublished data and clearly point out the territorialism in these species. The only North American trogon is mentioned briefly. The chapters on the two Central American kingfishers add perspective to his excellent account of the Belted Kingfisher. The territorialism and long incubation period are notable. A comparison of the life histories of the Whippoorwill, Nighthawks and allies indicates the uniformity of habits within the group. A comprehensive chapter on the Chimney Swift is accompanied by chapters on the western species and on one Asiatic form. Within the group there is a striking contrast between the uniformity of flight and feeding habits on the one hand and the variation in nesting habits on the other hand.

The chapters on the hummingbirds are a most useful compilation of information. The nesting habits are uniform throughout the group. The male ordinarily does not take part in the nest activities, although there is evidence that the male Broad-billed Hummingbird incubates. Two eggs are laid by all the species discussed. The behavior of several species indicates that the male has a courtship and a feeding territory and that the female has a nesting and a food territory. Saunders' (1936) recognition of this fact is omitted. Interspecific fighting is spectacular throughout the group. Arnold's (p. 372) description of breast coition is questionable. The erroneous statement (p. 422) that "the courtship performances of the hummingbirds all follow the same general pattern" is correctly contradicted by the splendid generalizations of Skutch (p. 433) concerning the 'static' and 'dynamic' types of courtship. In static courtship the birds gather singly or in assemblies to display from one particular spot. The dynamic

<sup>1</sup> Bent, Arthur Cleveland. Life Histories of North American Cuckoos / Goatsuckers, Hummingbirds / and their Allies / — / Orders Pittaciformes, Cuculiformes / Trogoniformes, Coraciiformes, Caprimulgiformes / and Micropodiiformes / Bull. U. S. Nat. Mus., no. 176, viii + 506 pp., 75 pls., 1940. Price 75 cts. (Superintendent of Documents, Washington, D. C.)

consists of the familiar pendulum aerial display. It is of interest that no temperate species uses the static type although this type is widespread throughout Central and even South America (*Phaethornis* and *Pygmornis*). The discussion of two tropical species by Skutch supplies much unpublished information. The chapter on the Ruby-throat describes the courtship and gives an analysis of the flight, as photographed by high-speed cameras.

Since this volume discusses several difficult families, some brief generalizations and analyses of the groups would be a desirable improvement. Further, while many of us decry the tendency to consider ornithology as no more than the study of territorialism, nevertheless the topic is of sufficient importance to merit a separate section in the life-history discussions. Thus the observations of Bullock in 1825 (p. 431) and of Henslow in 1877 (p. 416) on territorialism are obscured in the description of other topics. A refreshing feature is the wealth of data gathered from the older literature, indicating the author's familiarity with his subject. At times the point of view is too anthropomorphic. Others vie with modern authors in verbosity. The description of field marks is good, but at the present time probably superfluous in a book of this nature. The volume contains 135 excellent photographs, a detailed table of contents and an index to species and authors but not to subjects. The ten pages of bibliography unfortunately do not give the name of the publisher of the books included. This volume provides the basis for detailed life-history studies and exposes the deficiencies in our knowledge of many species.—D. E. DAVIS.

Roberts's 'Birds of South Africa' is a well-illustrated handbook<sup>1</sup> intended as "a simple guide to the species of birds" found south of a line from the Cunene River on the west coast to the Zambesi on the east, an area roughly 1600 miles wide and about 1000 miles in a north-south direction, and including therefore the African continent south of latitude 18°. So diverse are the local conditions in various parts of this area that no less than twenty-one minor subdivisions are defined in each of which the local climate, physiography and plant life are characteristic and support one or more endemic types of birds. This diversity of environment, with its lack of important physiographic barriers, and with a climate that imposes little need for lengthy migration, not only favors the development of geographic races of widespread species, but also makes a favorable winter home for migrants from the northern hemisphere, such as the White Stork or the Common Swallow of Europe.

The volume treats of no less than 875 distinct species, while in the case of those that divide into local races, these are separately listed under the specific form, with a few words as to their differential characters and range. For each species are given the accepted Latin name, the English and Afrikaans vernacular names, important synonyms, and the native names, often in several dialects. Dimensions in both inches and millimeters follow, together with a paragraph on the general range, habits and eggs. In lieu of descriptions, fifty-six colored plates scattered through the text at appropriate places give a visual and comparative idea of the colors, for on each plate are grouped often as many as twenty-five figures of allied species, which though of necessity small and somewhat crowded, are nevertheless so excellently reproduced that each is clear and its colors are well rendered. Thus the two plates of sunbirds show at a glance the compara-

<sup>1</sup> Roberts, Dr. Austin. *The Birds of South Africa* / 8vo, xxxii + 463 pp., 56 colored plates, 1940; H. F. & G. Witherby, Ltd., 326 High Holborn, London, W. C. 1. Price 30 shillings.



tive color characters of twenty-six species, and in most cases both sexes of each. In all, 1052 separate figures are thus included, each of which is given a number corresponding to that covering the account of the species in the text. These plates are the work of Norman C. K. Lighton, who has shown a remarkable skill in depicting and grouping so many species each in a natural if often somewhat conventional pose. There are separate indices of Latin, English, Afrikaans, and native names.

The publication of this book was made possible by subscriptions to the South African Bird Book Fund and the South African Ornithological Society. It should go a long way toward stimulating a popular interest in birds among the residents of South Africa as well as in furnishing them and the many visitors to this attractive land a ready means of identifying the host of remarkable birds they will meet with. The author's wide experience both in the field and in the study of museum specimens of South African birds gives his work a special value, for although in the recognition of genera and races, he may often show the opposite of conservatism, yet he has had the advantage of study on the spot and his views merit consideration.—G. M. ALLEN.

**Peattie's 'Audubon's America.'**—The fame of Audubon rests largely on his wonderful bird paintings and his 'Ornithological Biography' accompanying these folio plates. That he also made a contribution of lasting historical value in the picturesque accounts of pioneer life in his day, of his residence in New Orleans and of his visits to New England, is less generally remembered. It is the prime object of this handsome volume<sup>1</sup> to emphasize the latter aspect of Audubon's literary work, in order that we may have a more balanced picture of this extraordinary man. For, as Mr. Peattie rightly tells us, "the materials of history are . . . the accounts of eye-witnesses," and no writer of his time sets forth more intimately and vividly his personal impressions of America than Audubon, nor gives a better idea of frontier life of those days than he, who lived it eagerly and gloried in the still unspoiled beauty of that golden age of our fauna and flora.

Following the brief introduction, the author presents an excellent biographical sketch of Audubon, for the materials of which he acknowledges his debt to the well-known works of the late Professor F. H. Herrick and Stanley C. Arthur. On his own part, nevertheless, he shows a thorough acquaintance with the now voluminous literature relating to his subject, and supplements this study with an estimate of Audubon's personality and his competence as an observer. The seven chapters that make up the body of the volume are selections from the many sketches of contemporary life interspersed among the accounts of birds in the 'Ornithological Biography,' as well as transcripts from the less accessible journals which Audubon kept in his later years. These selections, each with a few introductory paragraphs by Mr. Peattie, include accounts of life in Kentucky, Audubon's meeting with Alexander Wilson and their mutual astonishment, his admiration for the Kentucky riflemen, his visit from that "odd fish," Rafinesque, as well as hunting tales, descriptions of pioneer types, the voyage down the Ohio and the Mississippi to New Orleans, Audubon's struggles to support himself, the Florida Keys as a bird paradise, the expedition to the forbidding Labrador coast, and the later visit to New England to procure subscriptions for his great work.

<sup>1</sup> Peattie, Donald Culross, ed. *Audubon's / America / the Narratives and Experiences of / John James Audubon /* Large 8vo, ix + 329 pp., 17 col. pls., 1940; Houghton Mifflin Co., Boston. Price \$6.00.

Other chapters picture the natural history of four magnificent birds from the 'Biography,' the Wild Turkey, the Whooping Crane, the Ivory-billed Woodpecker and the Carolina Parakeet, as well as life on the Dakota plains and the memorable journey up the Missouri River to Audubon's farthest west.

From these selections one gains an insight not only into the contemporary life of those widely separated parts of our continent but also into the nature of the man himself. Few have shown such versatility, such contrasts of temperament, such singleness of purpose, such unwavering courage and persistence in the face of constant discouragement. In his writing Audubon was at once vivid and vivacious, taking his reader intimately into his confidence. As an interesting sidelight Mr. Peattie recalls, however, that particularly in the conversational part of his narratives, Audubon seldom or never tries to reproduce dialect, but due probably to the formal hand of his editor, makes the runaway slave whom he met in the canebrake and the frontiersman of the Kentucky forest speak good Elizabethan English.

The volume is handsomely printed in large clear type, with generous margins to its ample pages, and is illustrated by seventeen beautiful colored reproductions of Audubon's paintings. For frontispiece is a self-portrait of the naturalist himself at the age of thirty-seven. There is a double-page panorama of Natchez in 1822, one of the few known landscapes by Audubon. The fifteen other plates, all but one in double-page size, reproduce a selection of eight of the birds and seven of the mammals from the folio works. A full index prepared by Mr. Francis H. Allen, makes the subject matter readily available, while the map on the inside cover allows the reader to follow Audubon on his journeyings. The volume is a welcome contribution to the study of Audubon's character and of the life of his day and generation, and provides for the reading public an aspect of the great naturalist that otherwise has been largely unavailable.—G. M. ALLEN.

**Bond's 'Check-list of Birds of the West Indies.'**—The West Indian subregion, lying almost at our doors, is one of peculiar interest to the naturalist. The origin of its fauna and flora, with many endemic species, is still a subject for active study and speculation. The present check-list<sup>1</sup> of its avifauna is based on the author's 'Birds of the West Indies' published in 1936, but includes much additional data on distribution and six species added during the intervening four years.

The author believes that the systematic study of West Indian birds is now almost completed in so far as the description of new insular races is concerned and in his subsequent reviews finds it necessary to reject some that are based on characters insufficient for recognition, though admitting freely that his viewpoint is not in all cases in agreement with that of other systematists. For each of the species and subspecies the Latin name is given, with the original reference and type locality, followed by a condensed statement of the range and present status. Except for the higher groups, vernacular names are omitted, which is unfortunate, for these would have made the list more readily available to the layman.

In the preface the author calls attention to the fact that within historic times more birds have "become extinct in this region than in any other part of the New World, but many more are in danger of becoming extinct in the near future." Obvious reasons for this are: primarily, man's encroachment on virgin forest and swamp-lands, indiscriminate shooting, the introduction of rats and the

<sup>1</sup> Bond, James. Check-list of Birds of the West Indies. 8vo, xi + 184 pp., map, 1940; Academy of Natural Sciences, Philadelphia. Price \$2.00.

mongoose, the arrival in the Lesser Antilles of the Glossy Cowbird, hurricanes and natural competition between allied forms occurring together. A list is given of thirteen species that are believed to have become extinct during the last century; another thirteen "will probably become extinct within the next hundred years," while thirty-eight others are now rare or local but probably in no immediate danger. Many doubtful records are excluded as having no value. A supplementary list includes fourteen birds known from subfossil bone fragments of no great age, a second includes eleven species that have been named from "hearsay," that is, based on descriptions of birds now extinct but recorded in earlier literature, all but one of which are parrots, while finally another thirteen forms are listed as introduced and now established, such as Guineafowl, and certain African weaver finches, probably relics of slave-trading days. A number of records based on escapes or chance occurrences are summed up in a paragraph. A full index of names and a map showing the author's voyages and visits to the various islands conclude the work. Since the West Indies are not included in the area covered by the A. O. U. 'Check-list,' this volume forms a welcome and useful supplement to that catalogue.—G. M. ALLEN.

**Witherby's 'Handbook of British Birds,' Volume 4.**—In spite of many difficulties, and even of the death of one of the co-authors, the fourth volume<sup>1</sup> of this splendid manual has been completed, carrying the treatment of British birds through the cormorants, gannets, petrels, grebes, divers, pigeons, sand-grouse, waders, bustards and cranes. The volume is fully up to the high standard set by those preceding it and presents for every bird in the British list, a condensed yet full account, under the headings of habitat, field-characters and habits, voice, display and posturing, breeding, food, distribution in British Isles and abroad, migrations, followed by a detailed description of the plumages and soft parts, with a general view of allied forms.

As in previous volumes, the series of colored plates is exceptionally well executed, and though each represents four species, often with a number of figures, these are clear and the color values good. A long series of text figures illustrating differential points in closely allied forms as well as several plates showing the appearance of various shorebirds in flight are effective aids in identification.

The cooperation of many other ornithologists in preparing details for this work is acknowledged and helps to make its comprehensive accounts of particular value. The editor points out that "after a most careful study" it has been decided to adopt in this volume many of the conclusions of Dr. P. R. Lowe as to the relationships of certain groups based on his anatomical studies. The more important departures from general usage are the recognition of the cranes and bustards as a suborder (Grues) of the Charadriiformes, the regrouping of the typical waders (suborder Limicolae) and especially the changes in grouping of certain forms which Dr. Lowe shows to have definite scolopacine rather than, as formerly considered, charadriine characters, and finally the subdivision of the genus *Charadrius* itself, on the basis of skeletal characters. These changes have been conservatively made, however, and as with the rest of the work, represent the latest advances in our present knowledge of these groups.

Many of the species are American forms that occur occasionally in the British

<sup>1</sup>Witherby, H. F., Jourdain, F. C. R., Ticehurst, N. F., and Tucker, B. W. *The Handbook of British Birds / Volume IV / . . . (Cormorants to Crane / 8vo, xiv + 461 pp., pls. 95-125, text figs., June 1940; H. F. & G. Witherby, Ltd., 326 High Holborn, London. Price separately 25 shillings.*

Isles, such as the Bartramian Sandpiper, the two species of Yellowlegs (here rechristened Yellowshanks) and Killdeer; others again are common alike on both sides of the Atlantic, so that the accounts are of special value to American ornithologists as well. The many footnotes often contain the most interesting observations, such as the discussion of the source of regurgitated oily matter by petrels, now looked on as an excretory product rather than as a residue from food substances.

This series forms a compendium of accurate and up-to-date information on birds of the western Palaearctic region unsurpassed in any single work hitherto attempted and in this country is perhaps nearest approached in the volumes of Bent's 'Life Histories.' We earnestly hope that in spite of present trying conditions abroad, the fifth and final volume of this work may appear in due course.

—G. M. ALLEN.

**Sowerby's 'Nature in Chinese Art.'**—The cultural level of a people is reflected by the interest they take in birds. Primitive races utilize them as food; then as their esthetic sense develops, birds' feathers enter into decoration, birds are kept as pets for their song and beauty, they become symbols and subjects for design, and finally sources of literary inspiration. It is therefore interesting to see the large part that birds have played in Chinese art as briefly set forth in the second chapter of this book.<sup>1</sup> The author, himself an artist and archaeologist, having spent most of his life in China, is well qualified to appreciate this aspect of ornithology. From the earliest times of which we have any knowledge, the Chinese have been artists of a high order and always birds seem to have been favorite subjects with them. More than any other people, the author tells us, they are bird lovers, delighting in the song and beauty of cagebirds. In their artistic representations of birds in paintings, carvings and bronzes, the Chinese are usually realists and in almost every case the species they depict can be identified, even though often these are shown in some degree of conventionalization. "Purely fabulous birds in Chinese art are almost exclusively confined to various representations of the feng huang," the so-called phoenix. This bird of course has nothing to do with the phoenix of western mythology. It is, Sowerby tells us, not a single bird but a pair, and its characters are largely derived from the Domestic Cock with features of various other Phasianidae added. Another group of bird representations includes a type with long crest and tail, and is believed by the author to be either composite or semi-fabulous. The mythology of Chinese birds is discussed and there is a list of species that the author has found depicted. Some of these, as the Mute Swan, are now rare in China; while the chance that some earlier paintings may represent species now extinct as a result of deforestation, should not be overlooked.

Other chapters of the book deal with mammals, wild and domestic, the so-called Chinese lion, reptiles, fishes, invertebrates and plants. Finally there is a useful chronological table of Chinese art by dynasties dating back to 2205 B. C. The many excellent illustrations, some in color, and the great amount of information gathered by the author during his lifelong residence in China, make this a most interesting and authoritative treatise.—G. M. ALLEN.

**Belopolski's Illustrated Album of Birds of the Barents Sea** is a neatly bound

<sup>1</sup>Sowerby, Arthur de Carle. *Nature in Chinese art.* / With two appendices on the Shang pictographs / by Harry E. Gibson. 8vo, 203 pp., illustrated, 1940; The John Day Co., New York. \$3.75.

oblong booklet<sup>1</sup> containing fourteen colored plates by N. N. Kondakova, showing some of the more conspicuous seabirds of that arctic region—the Fulmar, Cormorant, Arctic Tern, gulls of several species, Dovekie, Murre, Puffins, loons and Eider. A page of text in Russian, giving a short account of the bird figured, faces each of the plates and there is an added list of a dozen other common arctic birds. Notwithstanding the somewhat crude reproductions and occasional misspellings of Latin names, this little book will doubtless prove useful for those of the Soviet arctic possessions as an attractive guidebook to their limited avifauna. It is notable as one of the few books hitherto published intended to stimulate popular interest in birds of northern Russia and is issued by the State Reserve for Eiders and Seven Islands Bird Mart.—G. M. ALLEN.

## PERIODICAL LITERATURE

- ABDULALI, HUMAYUN. Swifts and terns at Vengurla Rocks. Journ. Bombay Nat. Hist. Soc., 41: 661-665, Apl. 1940.—Edible Swifts' nests swarmed with bedbugs in the non-nesting season.
- ALI, SALIM. The birds of central India. With notes by Hugh Whistler. Part II. Journ. Bombay Nat. Hist. Soc., 41: 470-488, Apl. 1940.—With descriptions of the chick and juvenal plumage of the Bush-quails, *Perdicula*.
- AMERICAN COMMITTEE FOR INTERNATIONAL WILD LIFE PROTECTION. Ratifications and applications of the London Convention for the Protection of African fauna and flora. Spec. Publ. Amer. Comm. for Internat. Wild Life Protection, no. 10, 16 pp., 1940.
- ANON. Arctic Three-toed Woodpecker nest found. The Passenger Pigeon (Madison, Wisc.), 2: 98-99, 2 figs., Aug. 1940.—In Price County, Wisconsin.
- ATKINSON, ROBERT, AND AINSLIE, JOHN A. The British status of Leach's Fork-tailed Petrel. British Birds, 34: 50-55, Aug. 1, 1940.—From a wider distribution, Leach's Petrel has receded to the western fringe of the British Isles but may now be regaining ground.
- AUSTIN, OLIVER L. Some aspects of individual distribution in the Cape Cod tern colonies. Bird-banding, 11: 155-169, Oct. 1940.—Fixity of certain habits, even reneiting in subsequent years on the same spot.
- BAKER, BERNARD W. Notes on Sandhill and Little Brown Cranes in Texas. Jack-pine Warbler, 18: 74-77, pl. 12, Aug. 1940.
- BALFOUR, F. R. S. Releasing game birds at Dawyck in Scotland. Avic. Mag., (5) 5: 195-198, Aug. 1940.—Among other exotic species, Wild Turkeys were found to thrive well.
- BARGER, N. R. June field notes. The Passenger Pigeon (Madison, Wisc.), 2: 91-94, July 1940.—Local Wisconsin notes.
- BARR, CHARLES WESLEY. The value of birds encouraged by dense highway plantings. Jack-pine Warbler, 18: 69-74, July 1940.
- BARTON, D. R. Chapin of the Congo. Nat. History (New York), 46: 123-125, 129-130, portrait, Sept. 1940.—An appreciation of Dr. J. P. Chapin and his work.
- BENE, FRANK. Rhythm in the brooding and feeding routine of the Black-chinned Hummingbird. Condor, 42: 207-212, fig., July 15, 1940.
- BENSON, C. W. Further notes on Nyasaland birds (with particular reference to those of the Northern province).—Part II. Ibis, (14) 4: 387-433, July 1940.

<sup>1</sup> Belopolski, L. O. Illustrated Album of Birds of the Barents Sea. [In Russian.] 16.5 × 22.5 cm., 32 pp., 14 col. pls., 1939; Murman Government Trust, Leningrad.



- BERGMAN, GÖRAN. Ueber die Ortstreue der Buchfinken (*Fringilla c. coelebs* L.) auf einem Schäreninselnchen. *Ornis Fennica*, 16: 95-98, Nov. 1899.
- BERGROTH, S., BRUUN, H., AND FREDRIKSON, K. A. Iakttagelser över fågelfaunan på Runsala vid Åbo. *Ornis Fennica*, 17: 1-7, 1940.—List of birds on the island Ruissalo near Åbo.
- BETTS, F. N., AND VESEY FITZGERALD, DESMOND. The birds of the Seychelles.—I. The endemic birds. II. The sea-birds—more particularly those of Aride Island. *Ibis*, (14) 4: 480-504, pls. 7, 8, July 1940.
- BIRABEN, MAX, AND SCOTT, MARIA. Observaciones sobre el 'pinguino' *Spheniscus magellanicus* J. R. Forster. *Physis*, 16: 245-251, 1939.—A description of nesting and persecution in southern Argentina.
- BLACKFORD, JOHN LINDSEY. Vertical birding. Highlights of western life zones. Bird-lore, 42: 405-413, 5 figs., 1940.—Birds in the Grand Canyon.
- BLACKFORD, JOHN LINDSEY. Birds of the yellow pine country. *Amer. Forests*, 46: 458-461, 5 figs., Oct. 1940.—On Rocky Mountain bird life associated with this pine.
- BLAKE, EMMET R. A new Venezuelan Honey Creeper. *Zool. Ser. Field Mus. Nat. Hist.*, 24: 155-157, June 29, 1940.—New form: *Diglossa baritula mandeli* from Mt. Turumiquire, Sucre.
- BOND, JAMES. Notes on birds from the West Indies and other Caribbean islands. *Notulae Naturae*, Acad. Nat. Sci. Philadelphia, no. 13, 6 pp., June 15, 1939.—*Coccyzus americanus julieni* Lawrence is regarded as a young of *C. americanus*; *Todus pulcherrimus* Sharpe is apparently a 'sport' of *T. subulatus*.
- BOND, JAMES, AND DE SCHAUENSEE, RODOLPHE MEYER. Descriptions of new birds from Bolivia. Part III.—Mesomyodi. *Notulae Naturae*, Acad. Nat. Sci. Philadelphia, no. 44, 4 pp., Apl. 5, 1940.—Six new races described.
- BOND, JAMES, AND DE SCHAUENSEE, RODOLPHE MEYER. Description of a new puff-bird from the lower Amazon. *Notulae Naturae*, Acad. Nat. Sci. Philadelphia, no. 50, 2 pp., July 11, 1940.—New race: *Nystalus striolatus torridus* from Rio Guamá, Pará, Brazil.
- BOND, RICHARD M. Birds of Anaho Island, Pyramid Lake, Nevada. *Condor*, 42: 246-250, Sept. 16, 1940.—Some fifteen species were found in late June, of which a colony of about three thousand White Pelicans comes in for most attention, with a list of the fish they feed to the young. A white minnow is chief of these.
- BRAUND, FRANK W. The birds of Smoky Creek Valley, Adams Co., Ohio. *Oölogist*, 57: 62-72, June 1940.
- BRAUND, F. W. Lincoln's Sparrow breeding on the upper Peninsula of Michigan. Jack-pine Warbler, 18: 67-68, fig., July 1940.
- BRODKORB, PIERCE. [Review of] Peters's Check-list of Birds of the World. *Wilson Bull.*, 52: 214-215, Sept. 1940.—On account of the displacement of *Micropus* by *Apus* and the diversity of opinion as to its preoccupation by *Apos*, this reviewer suggests that the ordinal, subordinal and family names of the swifts be based on *Chaetura* as the type genus. However, *Apos* may be regarded as wrongly transliterated and hence a coined word and indeclinable. Thus Aposidae would be its proper familial form instead of Apodidae, which is reserved for the swifts.
- BROEKHUYSEN, G. J., AND MEIKLEJOHN, M. F. M. European migrants at the Cape. *Ibis*, (14) 4: 542-544, July 1940.
- BROWN, ANNA E. 'Round the bird clock with the juniors. *Bull. Massachusetts Audubon Soc.*, 24: 103-107, Oct. 1940.—Nature work with youth.
- BRYANT, C. E. Photography in the swamps: the Little Grassbird. *Emu*, 40: 162-164, pl. 35, Aug. 1940.—Photographing *Megalurus gramineus* in Victoria.

- BRYANT, C. E. Feeding of the Swamp-hen. *Emu*, 40: 165-166, Aug. 1940.—Use of the foot in conveying food to the mouth observed in two species of *Porphyrio* in Australia.
- BRYENS, OSCAR MCKINLEY. Some notes on the Canada Goose. Jack-pine Warbler, 18: 81-82, pl. 13, Aug. 1940.
- BURLEIGH, THOMAS D., AND LOWERY, GEORGE H., JR. Birds of the Guadalupe Mountain region of western Texas. *Occas. Papers Mus. Zool., Louisiana State Univ.*, no. 8: 85-151, 4 pls., map, Aug. 20, 1940.—Field work resulted in listing of 86 species, the discovery of two new forms, elsewhere described, six additions to the known avifauna of Texas and six others definitely added to the known breeding species of the State.
- CAMRAS, SIDNEY. A new Savannah Sparrow from Mexico. *Zool. Ser. Field Mus. Nat. Hist.*, 24: 159-160, June 29, 1940.—*Passerculus sandwichensis rufofuscus* from Babicora, Chihuahua.
- CARR, V. A. V. Breeding British birds. (Cont.) *Avic. Mag.*, (5) 5: 165-167, pl., July 1940.—Ring Ouzel breeding in an aviary.
- CARR, V. A. V. Breeding British birds [in an aviary]. *Avic. Mag.*, (5) 5: 233-234, Sept. 1940.
- CHAFFER, NORMAN. Photographing the Avocet—and other birds—at Lake Midgeon. *Emu*, 40: 126-128, pls. 29-34, Aug. 1940.
- COMBS, LEROY S. Arcadia Sanctuary attracts many birds. *Bull. Massachusetts Audubon Soc.*, 24: 101-102, Oct. 1940.—Notes on increase in numbers of breeding birds since 1935 at the Sanctuary near Northampton, Massachusetts.
- CORTI, ULRICH A. Ornithologischer Notizen aus dem Tessin. *Der Ornith. Beobachter, L'Ornithologiste*, 37: 24-32, Feb. 1940; 37: 35-42, Mar. 1940.—Local Swiss notes.
- COWAN, IAN McTAGGART. Winter occurrence of summer birds on Vancouver Island, British Columbia. *Condor*, 42: 213-214, July 15, 1940.
- CRISWELL, ELIJAH HARRY. Lewis and Clark: linguistic pioneers. *Univ. of Missouri Studies*, 15: i-ccxi, 1-102, Apl. 1, 1940.—A study of the names of animals and plants used by these explorers with a concluding lexicon and bibliography. There is also a special list of the many animals arranged alphabetically with the names used for them. The study is especially concerned with new words or English words as fitted to the New World, i.e. 'Americanisms.'
- DAVIS, DAVID E. A suggestion concerning territorialism in *Tapera naevia*. *Wilson Bull.*, 52: 208, Sept. 1940.—The parasitic habit of the cuckoos has probably developed later than territorialism.
- DEADERICK, WILLIAM H. Audubon in Tennessee. *The Migrant* (Nashville, Tenn.), 11: 59-61, Sept. 1940.—From Audubon's writings.
- DEEKS, T. W. Unusual colouring in a Common Pochard (*Nyroca fuligula*). *Journ. Bombay Nat. Hist. Soc.*, 41: 667-668, fig., Apl. 1940.—With a crescentic white mark between eye and base of bill.
- DEIGNAN, H. G. Comments on *Criniger conradi* Finsch. *Ibis*, (14) 4: 528-529, July 1940.—The name in a subspecific sense replaces *Pycnonotus blanfordi robinsoni*.
- DELACOUR, J. Cabot's Tragopan (*Tragopan caboti*). *Avic. Mag.*, (5) 5: 185-186, col. pl., Aug. 1940.
- DELACOUR, J. Pheasants as park and garden ornaments. *Avic. Mag.*, (5) 5: 199-203, Aug. 1940.
- DOWNING, GLENN R. The winter habits of the Northern Pileated Woodpecker in

- Iowa. Iowa Bird Life, 10: 43-46, fig., Sept. 1940.—Calls, drumming, flight, and roosting habits. The birds excavate special roosting cavities.
- DuBois, A. Dawes. Nesting habits and behavior of Bell's Vireo. Audubon Bull., Illinois Audubon Soc., no. 35: 1-8, fig., Sept. 1940.
- Eakin, Robert E., McKinley, William A., and Williams, Roger J. Egg-white injury in chicks and its relationship to a deficiency of vitamin H (biotin). Science, 92: 224-225, Sept. 6, 1940.
- Edge, Mrs. C. N., and others. Hawk Mountain Sanctuary Association. Second Annual Report 1939-40, 4 pp., 3 figs., Sept. 1940.—Accomplishments of the Sanctuary, and table of seasonal counts of migrating hawks for six years past.
- Elliott, A. J. Birds at Lake Midgeon. Emu, 40: 123-125, Aug. 1940.
- Emerson, Guy. In quest of the Albatross. Bird-lore, 42: 339-347, 6 figs., 1940.—Photographing the Black-footed Albatross off California.
- England, E. G. A nest of the Arctic Three-toed Woodpecker. Condor, 42: 242-245, 2 figs., Sept. 16, 1940.—Near Gold Lake, Sierra Co., California, with excellent photographs of male and female at the nest hole.
- Falla, R. A. Occurrences of the McCormick Skua on the coast of New Zealand. Emu, 40: 119-120, Aug. 1940.—Two recent records for this south-polar species.
- Favaloro, N. J. Some birds of Womboyne Inlet. Emu, 40: 89-94, July 1940.—Notes on birds of this part of New South Wales.
- Ferris, Reed W. Eight years of banding of Western Gulls. Condor, 42: 189-197, 5 figs., July 15, 1940.—A dispersal of immature birds is general both north and south from a breeding colony. The heaviest mortality is during the first winter after hatching.
- Findlay, Hazel R. The European Widgeon in an Erie Marsh. Jack-pine Warbler, 18: 78-79, Aug. 1940.—A male on May 20, 1940, in southwestern Michigan.
- Flora, Aristides. Distribución geográfica de las especies de aves capturadas en la provincia de Jujuy y zonas limitrofes. Physis, 16: 271-289, 1939.—A distributional list mentioning the Rheiformes to Charadriiformes inclusive.
- Fladung, Edmund B. Birds of Baltimore and vicinity. Nat. Hist. Soc. of Maryland, 24 pp., 1900.—With migration dates and blank spaces for notes.
- Ford, Corey, and MacBain, Alastair. Happier hunting grounds. Collier's, the National Weekly, pp. 14-19, for Sept. 28, 1940.—On relations between farmer and sportsman, with colored figures of gamebirds by Lemuel Palmer.
- Ganier, Albert F., and Clebsch, Alfred. Summer birds of Fall Creek State Park [Tennessee]. The Migrant (Nashville, Tenn.), 11: 53-59, Sept. 1940.
- Gerard, John H. Barn Owl portraits. Bird-lore, 42: 422-426, 5 figs., 1940.—Notes on a brood of young in a grain elevator in Illinois.
- Grimes, S. A. Scrub Jay reminiscences. Bird-lore, 42: 431-436, 3 figs., col. pl., 1940.—With a photograph showing the male Florida Jay giving food to its mate sitting on the nest.
- Griscam, Ludlow. The changing seasons. Bird-lore, 42: 373-374; 451-452, 1940.—Brief review of eastern bird life in summer of 1940.
- Griscam, Ludlow, and others. The season. CXXXIII. April 15 to June 15, 1940. Bird-lore, 42, suppl.: 378-392, 1940.
- Griscam, Ludlow, and others. The season. CXXXIV. June 15 to August 15, 1940. Bird-lore, 42, suppl.: 458-473, 1940.
- Gromme, O. J. Arkansas Kingbird nesting in Wisconsin. The Passenger Pigeon (Madison, Wisc.), 2: 90-91, fig., July 1940.—Account of a nesting pair near Beloit, Wisconsin, with summary of other recent breeding records in that State.

- GROSS, ALFRED O. The migration of Kent Island Herring Gulls. *Bird-banding*, 11: 129-159, Oct. 1940.—Analysis of banding records. Evidence available indicates that the birds do not breed until the third season after hatching, when in their fourth year.
- GROSS, MARGARET E. A visit to Point Pelee. Jack-pine Warbler, 18: 88-90, Aug. 1940.—Spring migration.
- GUIMARAES, LINDOLPHO R. Malófagos da Cigana [*Opisthocomus hoazin* (Müller), 1776]. *Arquivos de Zool. Estado de São Paulo*, 1: 283-317, June 20, 1940.—Five species of Mallophaga from the Hoatzin are described and illustrated, one of which is new; three new genera are proposed.
- HAARTMAN, LARS V. Ueber den Tagesrhythmus des Mauerseglers, *Apus a. apus* (L.). *Ornis Fennica*, 17: 7-11, 1940.—With graphs showing relative activity at different times of day.
- HACHISUKA, THE MARQUIS. Aviculture in Japan. Long-lived Micronesian birds. *Avic. Mag.*, (5) 5: 173-176, July 1940.—Species of honey-eaters and white-eye lived ten years and over as cagebirds.
- HAMILTON, W. J., JR. Summer food of the Robin determined by fecal analyses. *Wilson Bull.*, 52: 179-182, fig., Sept. 1940.
- HARDY, ERIC. Uncommon birds on Merseyside, 1939. *Ibis*, (14) 4: 525-528, July 1940.
- HERRICK, EARL H., AND FINERTY, JOHN C. The effect of adrenalectomy on the anterior pituitaries of fowls. *Endocrinology*, 27: 279-282, Aug. 1940.—Causes degeneration of the testis indirectly through the pituitary.
- HERRICK, E. H., AND LOCKHART, CHARLES H. The effect of male sex hormone on the developing ovaries of young fowls. *Endocrinology*, 26: 508-510, Mar. 1940.—Young females so treated had ovaries slightly smaller and follicular development somewhat less than in controls.
- HIBBERT-WARE, MISS A. An investigation of the pellets of the Common Heron (*Ardea cinerea cinerea*). *Ibis*, (14) 4: 433-450, pl. 4, July 1940.—A description and analysis of pellets from Great Britain. Digestion is almost complete except for keratin and chitin and to some extent bone.
- HICKEY, JOSEPH J., ED. Bird-lore's fourth breeding-bird census. *Bird-lore*, 42, suppl.: 474-492, 1940.
- HINDWOOD, K. A. The birds of Lord Howe Island. *Emu*, 40: 1-86, pls. 1 (col.)-20, July 1940.—Of the indigenous species eight are now extinct. An analysis of the avifauna and history of this island off New South Wales.
- HOLMQUIST, ERIC. Bidrag till kännedon om järnsparven, *Prunella m. modularis* L., i Helsingfors-trakten. *Ornis Fennica*, 16: 98-101, Nov. 1939.—Nesting of this Grass Warbler in the Helsingfors district.
- HOOGERWERF, A. Enkele bijzonderheden van de op het Vulkan-eiland Goenoeng Api (Bandi Zee, N. O. I.) levende Oceaanvogels (eerste gedeelte). *Limosa, Orgaan d. Club van Nederl. Vogelk.*, 12: 43-79, pls. 1-6, 16 text-figs., Sept. 1939.—On the seabirds of Goenoeng Api, with photographs of adults, young, and eggs, particularly of *Sula* and *Fregata*.
- HOPKINSON, E. Latham as a bird fancier (cont.). *Avic. Mag.*, (5) 5: 176-182, July 1940.—Quotations from Latham on captive birds, of various passerine groups.
- HOPKINSON, E. Latham as a bird fancier. *Avic. Mag.*, (5) 5: 227-230, Sept.; 259-264, Oct. 1940.—Quotations from Latham's notes on various cuckoos, toucans and hornbills and parrots in captivity.

- HOPKINSON, E. Orioles which have been kept in captivity. *Avic. Mag.*, (5) 5: 238-240, Sept. 1940.—Six species of Old World genera.
- HOUSSE, EMILE. El Cóndor (*Vultur gryphus*, Linné). *Bol. Mus. Hist. Nat. 'Javier Prado'*, Lima, 4: 223-242, 1940.—General account of the habits of the Andean Condor.
- HUEY, LAWRENCE M. A new Cardinal from central Lower California, Mexico. *Trans. San Diego Soc. Nat. Hist.*, 9: 215-218, July 31, 1940.—*Richmondia cardinalis seftoni*, from Santa Gertrudis Mission.
- HULBERT, L. CLAIRE. A visit to a Black-crowned Night Heron rookery. *Jack-pine Warbler*, 18: 83-84, Aug. 1940.—On Saginaw Bay, Michigan.
- HUNDLEY, M. LEE. Some Detroit area nesting records. *Jack-pine Warbler*, 18: 86-87, Aug. 1940.
- HURSTHOUSE, E. W. Further notes on the breeding of the Little Blue Penguin. *Emu*, 40: 121-123, Aug. 1940.
- HUTT, F. B. A relation between breed characteristics and poor reproduction in White Wyandotte Fowls. *Amer. Naturalist*, 74: 148-156, Apl. 1940.—This breed is about 12 per cent less fertile than White Leghorns or Rhode Island Reds, due probably to linkage with some deleterious gene.
- HUTT, F. B., AND LAMOREUX, W. F. Genetics of the Fowl. 11—A linkage map for six chromosomes. *Journ. Heredity*, 31: 231-235, 2 figs., May 1940.
- IJAMS, H. P. 1940 bird nesting census. *The Migrant* (Nashville, Tenn.), 11: 73-74, Sept. 1940.—At Knoxville, Tennessee.
- JARCHOW, H. L. VON. Some observations on the Wood Duck. *The Passenger Pigeon* (Madison, Wisc.), 2: 89, fig., July 1940.—Nesting habits. Young are positively heliotropic and go toward the light of the nest entrance in leaving. The male parent remains in the vicinity of the nest and joins the family when they are partly grown.
- J[ONES], J[ACK]. Courtship feeding in birds. *Emu*, 40: 175-176, Aug. 1940.—A review of David Lack's paper in 'The Auk.'
- JONES, M. L. Birds in the hand. *Iowa Bird Life*, 10: 37-39, Sept. 1940.—Behavior of birds in banding traps. Harris's Sparrow easily becomes 'hypnotized'; other species vary in this behavior.
- JUNGE, G. C. A. Resultaten van het ringonderzoek betreffende den vogel trek, ingesteld door het Rijksmuseum van Natuurlijke Historie te Leiden, XXVI. *Limosa, Orgaan d. Club van Nederl. Vogelk.*, 12: 99-126, Sept. 1939.—Record of banding returns in Holland.
- KALMBACH, E. R., AND ALDOUS, S. E. Winter banding of Oklahoma Crows. *Wilson Bull.*, 52: 198-206, map, Sept. 1940.—Of recoveries, 75 per cent were killed in the Prairie Provinces of Canada.
- KATE, TEN. Ornithologie van Nederland 1939, 2e mededeling. *Limosa, Orgaan d. Club van Nederl. Vogelk.*, 12: 127-131, Sept. 1939.—Local records in Holland.
- KINGHORN, J. R. A new Bird of Paradise. *Australian Mus. Mag.*, 7: 130-131, col. pl., Mar. 1, 1940.—The plate illustrates the recently discovered McNicoll's Ribbon-tailed Bird of Paradise which lives on the forested upper parts of the range west and northwest of Mt. Hagen, New Guinea. The correct name for the bird is said to be *Taeniaparadisea mayeri* (Stoner).
- KLEINSCHMIDT, OTTO. Ueber südamerikanische Falken. *Physis*, 16: 103-107, 1939.—Discussion of three light-colored specimens from Punta Arenas, Argentina.
- KLUJVER, H. N. Ueber die Variabilität der Flügelänge in einer beringten *Parus*



- major-Population. *Limosa*, Orgaan d. Club van Nederl. Vogelk., 12: 80-86, 4 figs., Sept. 1939.
- KRIEG, HANS. Vogelbilder aus dem Gran Chaco. *Physis*, 16: 115-151, 1939.—A description of the birds of the Paraguayan Chaco in the various plant associations (biotopes).
- LACK, DAVID. Habitat selection and speciation in birds. *British Birds*, 34: 80-84, Sept. 2, 1940.—"Habitat differences probably play a subsidiary part in maintaining the segregation of closely related bird species, but not in originating the segregation leading to speciation."
- LACK, DAVID. Variation in the introduced English Sparrow. *Condor*, 42: 239-241, Sept. 16, 1940.—The introduced bird in America is "remarkably stable in wing and bill measurements," except in southern California where the bill averages slightly larger.
- LAMBERT, P. J. Pheasants of western China. *Avic. Mag.*, (5) 5: 206-212, Aug. 1940.—A resumé of notes on pheasants in E. H. Wilson's 'Naturalist in Western China.'
- LANG, ERNST M. Ornithologische Notizen vom Herbstzug 1939 im Urserntal. *Der Ornith. Beobachter*, L'Ornithologiste, 37: 47-50, Mar. 1940.—Fall migration in Switzerland.
- LASKEY, AMELIA R. The 1939 nesting season of Bluebirds at Nashville, Tennessee. *Wilson Bull.*, 52: 183-190, Sept. 1940.—Results of a study of a population in nest boxes.
- LAUBMANN, ALFRED. *Accipiter pectoralis* und seine Verbreitung in Sudamerika. *Physis*, 16: 110-114, 1939.—Two specimens from Paraguay, possibly migrants.
- LEAL, ADRIAN RUIZ. *Biologia de Rhea americana rothschildi* Bradbourne y Chubb. *Physis*, 18: 175-180, 1939.—A description of habits of feeding and food.
- LEACH, E. P. Recovery of marked birds. *British Birds*, 34: 61-64, Aug. 1, 1940.
- LONDON, ALAN. A trip to North Queensland. *Avic. Mag.*, (5) 5: 221-227, Sept. 1940.—Account of birds seen.
- LEWIS, F. Notes on the breeding-habits of the Mallee-fowl. *Emu*, 40: 97-110, pls. 22-27, Aug. 1940.—Average incubation period in the mound is fifty-seven days, but may be longer. The chick on hatching takes about two hours to reach the surface of the mound and is unassisted by the adults.
- LEWIS, MARY F. W. Sea island sanctuary. *Bird-lore*, 42: 331-338, 3 figs., 1940.—Bird life on Cobb Island.
- LOCKERBIE, C. W. Injured Mallards attended by mates. *The Gull* (San Francisco), 21: 83, Oct. 1939.—In winter near Salt Lake City.
- LOW, JESSOP B. Production of the Redhead (*Nyroca americana*) in Iowa. *Wilson Bull.*, 52: 153-164, 4 figs., Sept. 1940.—Water level an important factor in nesting success. Only about 38 per cent of eggs produced successful young.
- LOWTHER, E. H. N. Notes on some Indian birds. *Journ. Bombay Nat. Hist. Soc.*, 41: 526-547, 6 pls., Apl. 1940.—Photographs of several species at their nests.
- LOYSTER, E. L. Waterfowl banding in southern Wisconsin. *The Passenger Pigeon* (Madison, Wisc.), 2: 95-97, Aug. 1940.
- LYON, ETHEL V. Some interesting Australian birds. *Jack-pine Warbler*, 18: 85-86, Aug. 1940.
- MACDONALD, J. D. Melanism in *Cossypha niveicapilla*. *Ibis*, (14) 4: 537-538, July 1940.—*Bessornis melanota* becomes a synonym as a variable melanistic form.
- MACKWORTH-PRAED, C. W., AND GRANT, C. H. B. Systematic notes on East African

- birds.—XXVI. *Ibis*, (14) 4: 518-522, July 1940.—*Alseonax minimus* a race of *A. adustus* and on *Bradornis*.
- MAIN, T. C., compiler. Ducks unlimited census 1938 and 1939 and kee-man record book. Winnipeg, 50 pp., 4 col. pls., 1940.—A survey of waterfowl populations in northwestern North America.
- MALISOUX, Y. Our 1939 pheasant breeding season. *Avic. Mag.*, (5) 5: 186-192, Aug. 1940.—Among interesting aviary results, it was found that "a chick, to be successful in hatching, must first cut round three quarters of its shell, but for this accomplishment it must revolve in its egg," through kicking.
- MARTIN, A. A few notes on the shrikes. *Avic. Mag.*, (5) 5: 171-172, July 1940.—Various species as cagebirds.
- MAYFIELD, GEORGE R. August—the silent month for bird songs. *The Migrant* (Nashville, Tenn.), 11: 62-65, Sept. 1940.
- MAYR, ERNST. Birds collected during the Whitney South Sea Expedition. XLI. Notes on New Guinea birds. VI. *Amer. Mus. Novitates*, no. 1056, 12 pp., Apl. 15, 1940.—With the descriptions of eight new subspecies, and critical notes on the cassowaries, of which three species with their races are recognized.
- MAYR, ERNST. Birds collected during the Whitney South Sea Expedition. XLII. On the birds of the Loyalty Islands. *Amer. Mus. Novitates*, no. 1057, 3 pp., Apl. 15, 1940.—One new form, *Halcyon sancta macmillani*, is described.
- MAYR, E. Notes on Australian birds. I. The genus *Lalage*. *Emu*, 40: 111-117, Aug. 1940.
- McILHENNY, E. A. An early experiment in the homing ability of wildfowl. *Bird-banding*, 11: 58-60, Apl. 1940.
- McILHENNY, E. A. A record of birds banded at Avery Island, Louisiana, during the years 1937, 1938 and 1939. *Bird-banding*, 11: 105-109, July 1940.
- MEINERTZHAGEN, R. How do larger raptorial birds hunt their prey? *Ibis*, (14) 4: 530-535, July 1940.—Observations on method of attack and hunting by various species.
- MENDISABAL, MANUEL M. Las chachalacas de Mexico. *Revista Soc. Mexicana de Hist. Nat.*, 1: 179-182, Aug. 1940.—On the possibility of domestication as a source of meat and eggs.
- MEYLAN, O. Les observations de M. Edgar P. Chance sur le Coucou (*Cuculus canorus* L.). *Der Ornith. Beobachter, L'Ornithologiste*, 37: 19-24, Feb. 1940.
- MILLER, LOYE. Observations on the Black-footed Albatross. *Condor*, 42: 229-238, 3 figs., Sept. 16, 1940.—Many new observations on plumages, food and behavior, as noted off the California coast.
- MOFFITT, JAMES. The Ring-necked Duck in northern California. *The Gull* (San Francisco), 22: 13-15, Apl. 1940.—Increasing as shown by annual censuses at Christmas time since 1928.
- MONTAGNA, WILLIAM. The Acadian Sharp-tailed Sparrows of Popham Beach, Maine. *Wilson Bull.*, 52: 191-197, 2 figs., Sept. 1940.—A breeding female referred to the typical race, was taken in a colony.
- MOORE, ROBERT T. The nomenclature and habits of the Black-throated Copper-tailed Hummingbird. *Condor*, 42: 251-254, fig., Sept. 16, 1940.—Demonstrates that *Metallura atrigularis* of southern Ecuador should stand as a subspecies of *M. primolina*, of northern Ecuador.
- MOREAU, R. E. Distributional notes on East African Birds. *Ibis*, (14) 4: 454-463, July 1940.

- MORRISON, ALASTAIR. Las aves del Departamento de Huancavalica. Bol. Mus. Hist. Nat. 'Javier Prado,' Lima, 4: 242-246, 1940.
- MUNRO, J. A. Animal predation. Canadian Field-nat., 54: 82-83, Sept. 9, 1940.—A normal function.
- MURIE, OLAUS J. Food habits of the Northern Bald Eagle in Alaska. Condor, 42: 198-202, July 15, 1940.—Food remains at nests consisted largely of various of the more common seabirds. In the Aleutian Islands, at least, its food habits are harmless so far as man is concerned.
- MURPHY, ROBERT CUSHMAN. Todd's 'Birds of Western Pennsylvania.' The Cardinal, 5: 73-83, July 1940.—An appreciative commentary.
- NICHOLS, DAVID G. Scaup's nest in Berkeley. The Gull (San Francisco), 22: 37-38, Oct. 1940.—A nest found at Berkeley, California, was identified as having belonged to a pair of Lesser Scaup earlier seen in the vicinity. It was found to have been damaged and abandoned.
- NORDHOFF, CHARLES. Bird gossip from Tahiti. Avic. Mag., (5) 5: 167-171, July 1940.—The author has successfully introduced Wood and Mandarin Ducks, pheasants from California, Blue and Scarlet Tanagers and Western Bluebirds from America and two species of weaver finches.
- NORRIS, L. C., CASKEY, C. D., AND BAUERNFEIND, J. G. Malformation of the tarso-metatarsal and phalangeal bones of chicks. Poultry Science, 19: 219-223, 2 figs., May 1940.
- ORR, ELLISON. The Pileated Woodpecker in northeast Iowa. Iowa Bird Life, 10: 47-48, Sept. 1940.—Nesting.
- PARKS, G. HAPGOOD. Group return of White-throated Sparrows. Bird-banding, 11: 174, Oct. 1940.
- PEARSON, T. GILBERT. Birding below the Line. Bird-lore, 42: 315-322, 8 figs., 1940.—Notes on birds seen in southern South America on his recent journey and on the lack of protection accorded the avifauna.
- PECKHAM, GUY S. It happened in 42 days. Natural History (New York), 46: 145, Oct. 1940.—A pictorial history of the development of young Red-tailed Hawks, with a colored figure on cover.
- PHYTHIAN-ADAMS, E. G. Small game shooting in Mysore. Journ. Bombay Nat. Hist. Soc., 41: 594-603, pl., Apl. 1940.—With records of snipe and waterfowl killed over a period of fourteen years.
- PHILLIPS, W. W. A. Some observations on the nesting of *Hemipus picatus leggei*, the Ceylon Black-backed Pied Shrike. Ibis, (14) 4: 450-454, pls. 5, 6, July 1940.
- PINTO, OLIVERIO. Aves de Pernambuco. Arquivos de Zool. Estado de São Paulo, 1: 219-282, pls. 1-6, June 9, 1940.—New is: *Myrmeciza ruficauda soror*, Tapera; with colored figure.
- PONCY, R. Observations faites à la Station Ornithologique du Port de Genève. Der Ornith. Beobachter, L'Ornithologiste, 37: 42-46, Mar. 1940.—Waterbirds.
- POUGH, RICHARD H. Massacred for millinery. Bird-lore, 42: 395-404, 6 figs., 1940.—Many of the larger species of birds are still killed for their plumage for use in millinery and are sometimes illegally sold.
- POUGH, RICHARD H. Hawks aloft. Natural History (New York), 46: 146-151, chart, Oct. 1940.—A brief account of American hawks.
- RAND, A. L. Flying birdmen. Natural History (New York), 46: 136-141, illustr., Oct. 1940.—With various bird notes from the Archbold New Guinea Expeditions.
- RANDALL, PIERCE E. Seasonal food habits of the Marsh Hawk in Pennsylvania. Wilson Bull., 52: 165-172, Sept. 1940.—General food habits are beneficial from

- the human standpoint. Mice form the staple food during ten months of the year, with an increase in number of young birds in June and July.
- RANKIN, M. NEAL, AND RANKIN, DENIS H. Additional notes on the roosting habits of the Tree-creeper. *British Birds*, 34: 56-60, 2 figs., Aug. 1, 1940.—Like our Brown Creeper, the British bird roosts in depressions of tree trunks.
- REINIKAINEN, ANTTI. Zur Brutbiologie des Karmingimpels, *Carpodacus c. erythrinus* (Pallas). *Ornis Fennica*, 16: 73-95, Nov. 1939.—The breeding cycle of the Rosy Bullfinch in Finland (in Finnish with German resumé).
- RILEY, J. H. Five new forms of birds from southern Annam. *Proc. Biol. Soc. Washington*, 53: 47-50, Apl. 19, 1940.—These are: *Pericrocotus solaris deignani*, *Pomatorhinus ochraceiceps alius*, *Leioptila annectens eximia*, *Anthipes solitaria euroa*, and *Tribura idonea*.
- RILEY, J. H. Three new forms of birds from South Annam. *Proc. Biol. Soc. Washington*, 53: 79-80, June 28, 1940.—New are: *Oriolus chinensis invisus*, *Franklinia rufescens dalatensis*, and *Arachnothera magna remota*.
- RIPLEY, S. DILLON. Wild ducks for the asking. *Natural History* (New York), 46: 171-176, 186, illustr., Oct. 1940.—On keeping a duck pond for ornamental wild-fowl.
- RODGERS, THOMAS L., AND SIBLEY, CHARLES G. Frequency of occurrence of birds on the Berkeley campus, University of California. *Condor*, 42: 203-206, graphs, July 15, 1940.
- ROMANOFF, ALEXIS L. Physicochemical changes in unfertilized, incubated eggs of *Gallus domesticus*. *Food Research*, 5: 291-306, 1940.
- ROMANOFF, ALEXIS L. Detection of fertility in eggs. *U. S. Egg and Poultry Mag.*, 46: 106-108, 1940.
- ROONWAL, M. L. On the occurrence of Swinhoe's Snipe, *Capella megalla* (Swinhoe), in Bengal, with remarks on its distribution in the Indian region. *Records Indian Mus., Calcutta*, 42: 109-113, pl. 3 (map), Mar. 1940.
- SANDERS, EARL. Autumn birds of an eastern Bob-white experimental game management area in southern Iowa. *Iowa Bird Life*, 10: 39-42, Sept. 1940.
- SCOTT, A. H. A hybrid Bullfinch and other varieties. *Avic. Mag.*, (5) 5: 235-238, Sept. 1940.—A cinnamon variety bred in captivity.
- SCOTT, THOMAS G., AND MOORMAN, ROBERT. Turkey Vultures in central Iowa. *Iowa Bird Life*, 10: 34-37, fig., Sept. 1940.—Notes on nesting, food, from a study of crop contents of young, and on growth.
- SEDGWICK, ERIC. Birds of the Rockingham district [Western Australia]. *Emu*, 40: 129-152, Aug. 1940.—With many notes on local habitats, fluctuations in numbers, and seasonal abundance.
- SELIGMAN, O. R., AND WILLCOX, J. M. Some observations on the birds of Jan Mayen. *Ibis*, (14) 4: 464-479, July 1940.—With notes on stomach contents of nine species. A young guillemot was found in the stomach of a Glaucous Gull and cuttlefish remains in those of Fulmars.
- SERVENTY, D. L. A new sub-species of cormorant from Western Australia. *Emu*, 40: 87-89, July 1940.—The new race, *Phalacrocorax varius nitidus*, is from the Abrolhos Islands, and is characterized by a red base of the bill.
- SERVENTY, D. L. Reflections on bird protection—the neglect of habitat protection. *Emu*, 40: 153-158, Aug. 1940.—In New South Wales alteration of habitats by man's influence has had ill effects.
- SETH-SMITH, DAVID. Peafowl. *Avic. Mag.*, (5) 5: 204-206, pl., Aug. 1940.—The

- Common and the Javan Peacocks, though so distinct, hybridize freely in captivity, and the progeny is fertile.
- SETH-SMITH, DAVID. The Yellow-rumped Finch (*Munia flaviprymna*). *Avic. Mag.*, (5) 5: 219-220, col. pl., Sept. 1940.—Notes on captives and hybrids of this rare Australian bird.
- SIBLEY, CHARLES G. The Warbling Vireo of the Cape district of Lower California. *Condor*, 42: 255-258, 2 figs., Sept. 16, 1940.—With map of the distribution of *Vireo gilvus leucopolius* in California and adjacent States, and description of the bird from Victoria Mountains of Lower California as *V. g. victoriae*.
- SIBLEY, C. L. The Philadelphia game bird show for 1940. *Avic. Mag.*, (5) 5: 213-217, Aug. 1940.
- SMITH, H. C., GARTHWAITE, P. F., AND SMYTHIES, B. E. Notes on the birds of Nattaung, Karenni. With systematic notes by Dr. C. B. Ticehurst. *Journ. Bombay Nat. Hist. Soc.*, 41: 577-593, map, Apl. 1940.
- SOUTHERN, H. N. The spring migration of the Wood-warbler over Europe. *British Birds*, 34: 74-79, map, Sept. 2, 1940.—The map shows the average isochronal lines of the northward migration of *Phylloscopus sibilatrix* over Europe.
- SPERRY, CHARLES C. Food habits of a group of shorebirds: Woodcock, Snipe, Knot, and Dowitcher. U. S. Dept. Interior, Wildlife Research Bull., no. 1: 1-37, 3 col. pls., 1940.—An important summary of food habits. More than four-fifths of the food of each is animal matter. In all but Woodcock, marine worms, mostly clamworms (enemies of clams, oysters and other shellfish) were found, and were the second most important item in the Eastern Dowitcher. Earthworms (an intermediate host of the gapeworm of chicks) made up more than two-thirds of the Woodcock's diet. Insects were the dominant food of Dowitchers and Wilson's Snipe.
- STEVENS, O. A. The Inland Bird Banding Association. *Wilson Bull.*, 52: 175-178, Sept. 1940.
- STEVENS, O. A. Bird banding in the last five years. *Bird-banding*, 11: 169-173, Oct. 1940.—Summary of work in North America.
- STILES, BRUCE F. Nesting of the Piping Plover in Iowa. *Iowa Bird Life*, 10: 48-49, 2 figs., Sept. 1940.
- STONER, EMERSON A. Nesting of Slender-billed Nuthatches. *The Gull* (San Francisco), 22: 34-35, Sept. 1940.—In California.
- STONER, EMERSON A., AND GRAHAM, J. DUNCAN. Birds along the Sears Point Road in Solano County [California]. *The Gull* (San Francisco), 22: 15-16, Apl. 1940.
- SUTTON, GEORGE MIKSCH, AND BURLEIGH, THOMAS D. Birds of Valles, San Luis Potosi, Mexico. *Condor*, 42: 259-262, Sept. 16, 1940.
- TAVERNER, P. A. The distribution of the Western Solitary Sandpiper. *Condor*, 42: 215-217, 2 figs., July 15, 1940.—Breeds from Hudson Bay to and including Alaska, and southward from tree limits to northern British Columbia, Great Slave Lake and Churchill.
- TAVERNER, P. A. The Ruffed Grouse and island populations. *Canadian Field-nat.*, 54: 90, Sept. 9, 1940.—Comment on failure of this bird to establish itself on Newfoundland, Anticosti, Queen Charlotte Islands, though present on Prince Edward Island.
- TICEHURST, CLAUD B. Systematic notes on Indian birds.—VII. *Ibis*, (14) 4: 523-525, July 1940.
- TICEHURST, CLAUD B. Notes on the Moorhen (*Gallinula chloropus chloropus*). *Ibis*,



- (14) 4: 539-542, July 1940.—Sexual ratio is 57.7 per cent of adult males; weights and measurements also given.
- TUCKER, B. W. Francis Charles Robert Jourdain: an appreciation. *Ibis*, (14) 4: 504-518, pl. 9, July 1940.—With portrait and a bibliography.
- TUFTS, ROBIE W. Ruffed Grouse on Grand Manan Island. *Canadian Field-nat.*, 54: 89, Sept. 9, 1940.—Although absent prior to 1925, a stock was introduced in that year and the island is now well populated.
- TURBOTT, E. G. A bird census on Taranga (The Hen). *Emu*, 40: 158-161, Aug. 1940.—Census on an island of New Zealand.
- VAIDEN, M. G. Interesting Mississippi birds. *The Migrant* (Nashville, Tenn.), 11: 66-68, Sept. 1940.—With several new records for the State.
- VAN ROSSEM, A. J. Du Bus' type of the Collared Towhee, *Pipilo torquatus*. *Wilson Bull.*, 52: 173-174, Sept. 1940.—Believes the type is an "obvious hybrid between what has currently been called *torquatus* and some other *Pipilo*, probably *maculatus*," hence he revives *ocai* of Lawrence for the nominate race.
- VESALL, DAVID B. Notes on nesting habits of the American Bittern. *Wilson Bull.*, 52: 207-208, Sept. 1940.—In Minnesota.
- VRIES, V. DE. Bijdrage tot de voedselbiologie van een viertal eendensoorten, naar aanleiding van materiaal, afkomstig van Vlieland en Terschelling. *Limosa, Orgaan d. Club van Nederl. Vogelk.*, 12: 87-98, Sept. 1939.—Food of Mallard, Pintail, European Widgeon, and European Teal in Holland.
- VRIES, V. DE. Oölogische en nidologische mededeelingen, 1939, 1. *Limosa, Orgaan d. Club van Nederl. Vogelk.*, 12: 131-132, Sept. 1939.
- WALKINSHAW, LAWRENCE H. A Kirtland's Warbler return. *Jack-pine Warbler*, 18: 91-92, Aug. 1940.—An adult female banded June 24, 1938, on its nest was recaptured nesting on June 23, 1940, in the same area near Lake Margrethe, Michigan.
- WATERSTON, DORA E. Humming-bird vicissitudes. *Nature Notes* (Peoria, Ill.), 7: 192-193, Aug. 1940.—On a July day, a female made its way into a house and unable to find the exit, became exhausted. The rescuer carried the bird to the next house followed closely by an adult male, which, when the female revived enough to fly, seemed to help support it in the air till both reached a maple branch "ten feet away where they rested a while before finally darting off together"!
- WATSON, FRANK G. The Little Blue Heron in the San Francisco Bay region. *The Gull* (San Francisco), 22: 37, 1940.—An adult bird seen Aug. 10, 1940.
- WEBB, JOSEPH J. Pied-billed Grebe feeding its young. *The Gull* (San Francisco), 22: 21, June 1940.—Young fed on minnows.
- WEBB, JOSEPH J. Point Lobos Reserve and Monterey Bay area. *The Gull* (San Francisco), 21: 82-83, Oct. 1939.
- WELLS, WILLIAM H. Starlings attack cattle in Kansas and other Plains States. *Oölogist*, 57: 76-77, July 1940.—In winter of 1937-38 European Starlings were seen alighting on the backs of cattle to feed on the partially extruding larvae of the ox warble; in the winter of 1939-40 when snow covered the ground this was again noted. In the same winter steers branded with an acid brand were seen to be much harassed by the birds, which alighted on the backs of the cattle, picked at scabs and made open and deep sores. With the melting of the snow the birds sought food from the ground and the trouble abated.
- WETMORE, ALEXANDER. A systematic classification for the birds of the world. *Smithsonian Misc. Coll.*, 99: no. 7, 11 pp., Oct. 10, 1940.—A revised edition with a few changes. The arrangement follows the plan that the "central group

through which further progress may be expected," is placed at the end of the list of families.

WHITTELL, H. M. Herman Franz Otto Lipfert. *Emu*, 40: 118-119, pl. 28 (portrait), Aug. 1940.—Account of his work as taxidermist at Western Australian Museum, Perth.

WHITTELL, H. M., AND WHITE, S. R. The Red-tailed Tropic-bird in Western Australia. *Emu*, 40: 95-96, pl. 21, July 1940.—Breeding on the Australian mainland near Busselton.

WINTERBOTTOM, J. M. Notes on birds observed on two voyages between Cape Town and Southampton. *Ibis*, (14) 4: 535-537, July 1940.—Especially on albatrosses and petrels.

WOODS, GORDON T. New England hurricane benefits wildlife. *Amer. Forests*, 46: 402-404, 424, 5 figs., Sept. 1940.—By creating blowdowns and shelters, and by making open spaces where sprout growth comes in, wildlife may be favored.

WOODS, GORDON T. Chimney Swifts destroy many insects. *Bird-banding*, 11: 173, Oct. 1940.

WORMALD, HUGH. Bearded Tits (*Panurus biarmicus*). *Avic. Mag.*, (5) 5: 231-232, Sept. 1940.—Notes on breeding in captivity.

WORTH, C. BROOKE. Adventures of a naturalist in Honduras. Part II. Birds of the pine forests. *Bird-lore*, 42: 323-330, 5 figs., 1940.—With notes on distribution.

WORTH, C. BROOKE. Adventures of a naturalist in Honduras. Part III. *Bird-lore*, 42: 414-421, 3 figs., 1940.

WORTH, C. BROOKE. Differential erosion of gastroliths in a Mourning Dove. *Bird-banding*, 11: 173, Oct. 1940.

## CONSERVATION NOTES

BY FRANCIS H. ALLEN

IN September the Federal Migratory Bird Commission approved the purchase of fourteen new waterfowl refuges with a total of nearly seventy-thousand acres. The purchases include areas in twelve States from Massachusetts and Vermont to Louisiana and Washington. The Okefinokee Refuge in Georgia, with its more than thirty-two thousand acres, is the largest.

THE National Association of Audubon Societies, now operating under the shorter name of 'National Audubon Society,' has uncovered an alarming situation in the use of feathers for millinery. We had come to the belief that the fight against this particular evil, begun by the American Ornithologists' Union in 1884 and continued for years, especially by the Audubon Societies, had long since been won. Now, however, it appears, as set forth in 'Bird-Lore' for September-October, 1940, that fashion encourages the use of the quills of eagles, swans, pelicans, herons, and albatrosses, besides those of South American condors and other foreign birds, and pheasant quills not all of which are from domesticated birds. Most of this traffic is clearly illegal and can be stopped by vigilant enforcement of the law, but there are loopholes in the law that encourage evasion and that should be closed by new legislation. The provision that plumage imported before 1913 may be sold and worn legally should certainly be repealed after the passage of twenty-seven years has allowed dealers to dispose of their stock; and a change in the section relating to the use of feathers in the making of fishing-flies is demanded, so as to prevent the diversion of such feathers to the adornment of women's hats. Readers of 'The Auk' will naturally do all they can to assist in the promotion of the needed legislation as well as in the enforcement of the existing law.

THE change of the name of the National Association of Audubon Societies to 'National Audubon Society,' though in some ways an improvement, is not giving universal satisfaction on account of the tendency to shorten the name still further by omitting the word 'National' and so leading to confusion with the State Audubon Societies, some of which have been the Audubon Society at home for many years.

DIRECTOR John H. Baker reports in the September-October 'Bird-Lore' that last January's freeze in Texas worked much havoc among Brown Pelicans, Spoonbills, herons, and egrets, chiefly through cutting off their food-supply, but that the discovery of several new colonies somewhat offset the bad news. There are ups and downs in the populations of these large southern waterbirds, but the outlook, on the whole, seems not too discouraging.

THREE or four years ago the writer took occasion to publish in the pages of the 'Bulletin of the Massachusetts Audubon Society' an appeal for support of 'The Auk' as the leading ornithological journal in America and the organ of the ornithologists who have made possible the study of birds in this country and to whom all bird-lovers owe a debt of gratitude that should be paid, in part, in the dollars and cents of membership dues for the A. O. U. This appeal met with some success—not so much as I had hoped, but some. Now I should like to make a similar appeal to ornithologists to do all they can to support the Audubon Societies, national and State, in their work to preserve the birds that the members of the A. O. U. study. Membership in the National Audubon Society, including the subscription to 'Bird-Lore,' costs but \$5.00 a year, and State society dues are always, I think, considerably less. I know that many ornithologists are already faithful supporters of this work, but I am sure that the Audubon Societies would like to have this support made unanimous.

## NOTES AND NEWS

## CHARLES A. URNER'S 'BIRDS OF ELIZABETH, NEW JERSEY, AND VICINITY'

THE late Charles A. Urner of Elizabeth, New Jersey, was known to his many friends and acquaintances as one of the most indefatigable of field ornithologists. Although ornithology was but his avocation, he found time to go afield at frequent intervals throughout the years and assembled a great deal of information on the birds of his particular region. Some idea of the extent of this information may be found in numerous articles published by Mr. Urner but there is additional evidence in an unpublished volume now at hand. This volume, entitled as above, was left to the American Museum of Natural History at Mr. Urner's death in 1938, with the proviso that some account of it be published in the pages of 'The Auk.' In fulfillment of this wish, the following account of the book may here be offered.

The volume is a medium quarto (9 by 12 inches) loose-leaf notebook with printed title-page and explanatory 'foreword,' a map of a portion of Union County, New Jersey, showing the routes usually followed by Mr. Urner, and an alphabetical index of species under their vernacular names. The rest of the volume up to an 'Appendix,' which will be discussed later, is devoted to the 'Systematic List.'

Each species is given a full leaf ruled horizontally and vertically into rectangles, one for each month of the year and with a separate horizontal row for each year. A vertical line has been drawn for every observed occurrence of the species, indicating by the height of the mark the number of individuals seen and by the position in the rectangle the date of observation. A red line then encloses the successive marks, showing by the changes in outline the seasonal variation in abundance and by comparison of curves the annual fluctuations. Since the observations here summarized were always made in the same general region on trips of approximately equal length (four hours), the curves are comparable and since there are nearly weekly observations throughout the years from 1916 to 1926, the data are reasonably complete. Sometimes, as in the case of the Song Sparrow, there are two curves, one for each of two different kinds of terrain. A space for remarks at the foot of each page is often filled with instructive notes bearing on the subject matter of the adjacent curves,—identifications of rare species, possible reasons for changes in abundance, unusual circumstances, and similar topics. The series breaks with the Black-capped Chickadee in 1926, showing where the compilation was interrupted by the author's death.

As an 'Appendix,' various generalized summaries are presented: curves showing the number of birds seen on each trip in the uplands near Elizabeth and in the salt marshes of the same region, for 1921 and 1922; a large, folded chart showing the monthly fluctuation of abundance of the various families of birds in the upland populations during 1920, reduced to number of birds per field hour; tables of the basic figures of this chart broken down in various ways and with similar figures for the upland birds in 1921 and for the salt meadows and bays for 1921 and 1922; charts of the apparent monthly variations in the total bird population of the uplands and of the salt marshes and bays, both for various years. Finally, there are sketch maps of a limited area about Elizabeth, New Jersey, divided into three sections of about 79, 84, and 73 acres, respectively, each with its weed patches, meadows, grain fields, swamps, plowed fields, and such

characteristics duly plotted and marked as they varied or remained unchanged each year from 1920 to 1927. For each year there is an accompanying table showing the number of pairs of each species of bird found nesting in each section during that year and summaries of the totals of pairs and species, native and introduced.

Mr. Urner's methodical mind is evident on every page of this uncompleted volume. The data are clearly presented and demonstrate in the best manner the value of simple, frequent, and consistent bird lists, systematically kept and properly analyzed. At a time when such lists are frequently severely criticized for their apparent lack of utility, this manuscript volume stands as a guide to the manner in which these lists may be intelligently kept and studied. The book will be preserved in the library of the American Museum of Natural History where it is hoped it will prove of service to many students of birds with a wide variety of interests.—JOHN T. ZIMMER.

#### IN MEMORY OF WIRT ROBINSON

MANY of the friends and admirers of Colonel Wirt Robinson will be glad to know that a beautiful and suitable memorial has been built for him at West Point. I had the pleasure of seeing this memorial on a recent trip to the United States Military Academy. The memorial, which is located not far from the Chapel, takes the form of a bird pool in the corner of the terraced gardens. Water runs over a moss-covered rock into a shallow pool. At the right stands a small bronze group of ducks, male, female, and young. In front is a low, rough stone with a small bronze plaque, in the center of which is a simple inscription:

#### THE WIRT ROBINSON MEMORIAL

A gift to the Military Academy  
From the friends of

Colonel Wirt Robinson, Professor, U. S. M. A.

In affectionate remembrance of his

Eminent attainments in the natural sciences

And of his

Great love of nature and of wild life

1940

Around the edges of the plaque are reliefs of wild animals—birds, mammals, fish, and a butterfly.

Colonel Robinson was a distinguished Virginian. For twenty-two years, from 1906 to 1928, he taught chemistry at West Point. In his special field, the chemistry of explosives, he attained high distinction. All his holiday periods were used in the study of natural history, particularly of birds. He was an Associate of the American Ornithologists' Union from 1897, and a Member from 1901. Quite as remarkable as his ability in his profession and in his life-long avocation of ornithology was his genius for friendship, to which this memorial is a spontaneous tribute. Two of his old students in Washington had told me about the memorial; and there was evident affection in the way in which they spoke of him. The same admiration and affection were shown by one of the workmen in the Academy grounds. When I asked him if he could show me the way to this



memorial, he answered: "That I can. I knowed him well. He was a good man. I know he would've liked that duck." He went on to speak proudly of his association with Colonel Robinson, and of the Colonel's kindness to him.

—J. J. MURRAY.

ON September 28, 1940, the new Minnesota Museum of Natural History of the University of Minnesota, at Minneapolis, was formally dedicated. The building was made possible by the gift of Mr. James Ford Bell, with supplementary funds from the Public Works Administration. Dr. Thomas S. Roberts, the Director, and a Fellow of the A. O. U., to whose untiring labors the success of the Museum is largely due, was given the honorary degree of Doctor of Science by the University last June.—Ed.

A BRONZE plaque in memory of Dr. Joseph Kalbfus (1852–1919) was unveiled in the State capitol of Pennsylvania, on July 10, 1940. It is the work of the famous Pittsburgh sculptor, Frank Vittor, and was given by the Pennsylvania Federation of Sportsmen's Clubs. Dr. Kalbfus was a pioneer in the movement for wildlife conservation, and was for the last twenty-one years of his life Secretary and Chief Game Protector of the Game Commission of Pennsylvania. We are indebted to Mr. Seth Gordon, Executive Director of the Pennsylvania Game Commission for a notice of the dedicatory exercises and a photograph of the plaque.—Ed.

ERNEST G. HOLT, Chief of the Biology Division of the Soil Conservation Service, has been granted leave of absence from the U. S. Department of Agriculture for a period of four or five months in order that he might accept an invitation from the International Health Division of the Rockefeller Foundation to collaborate in studies designed to clear up some of the biological problems surrounding sporadic outbreaks of jungle yellow fever. One of these is the possibility that birds act as a reservoir of the disease. Mr. and Mrs. Holt proceeded to Brazil by airplane July 11 to take up their new duties in country already familiar through several expeditions that have taken them into practically every part of that country.—W. L. MCATEE.

## CORRESPONDENCE

## UNIDENTIFIED BIRD NAMES

Editor of 'The Auk':

In 'The Auk' for April 1919, the writer gave notice of the preparation of a dictionary of vernacular names of Check-list birds. Collection of the terms has been going on for thirty years and the time for putting in form a vocabulary of a fair degree of completeness now appears not prohibitively distant.

The previous notice elicited some valuable contributions; now another generation of ornithologists is available and it is hoped that some of them will cooperate in improving the collection. Unusual names with notes on the localities where they are used are particularly desired.

Appeal is made also for aid in identifying any of the names here listed. These are mostly genuine vernaculars from correspondents of the U. S. Biological Survey and do not include the time-honored puzzles that have appeared in print.

Baulk—Newfoundland  
 Bacayere—Gulf of St. Lawrence  
 Bird, Gray—North Carolina  
 Bird, Housefly—South Carolina  
 Bird, Little Brown Prairie—Montana  
 Bird, Mumac—Ohio  
 Bird, Spring—New England  
 Bird, Sugar-beet—Colorado  
 Buzzard, Gray Star—Iowa  
 Duck, Snowball—Tennessee  
 Finch, Green—Ohio  
 Hawk, Hedge—Iowa  
 Hawk, Mexican—Oklahoma  
 Kingbird, Custard—Vermont  
 Linnet—Tennessee  
 Linnet, Blue Pine—Colorado  
 Pewee, Barn—Virginia  
 Pewee, Moss—Virginia  
 Pewee, Yellow—Virginia  
 Pigwick—Maryland  
 Quail, Cedar—Colorado  
 Rachel Jane—Kansas  
 Rail, Land—Michigan (breeding)  
 Redbird, Cedar—South Carolina  
 Robin, Cow—New York  
 Robin, Snipe—Michigan

Scurwink—Newfoundland  
 Sing Giller—South Carolina  
 Sparrow, Bush—Virginia  
 Sparrow, Golden—Oregon (breeding)  
 Sparrow, Red-headed—North Carolina  
 Sparrow, Weed—Missouri  
 Sparrow, White-faced—North Carolina  
 Sparrow, Yard—Virginia  
 Starling, Wood—Virginia  
 Stonesmith—North Dakota  
 Swallow, Bridge—Nebraska  
 Swinger, Large—Virginia  
 Swinger, Small—Virginia  
 Tanager, Purple—Ohio  
 Thaddy—South  
 Thrasher, Pig—Georgia  
 Thrush, Blue—Missouri  
 Thrush, Speckled—North Carolina  
 Titmouse, Yellow-headed—Ohio  
 Warbler, Green—Illinois  
 Waskite—Virginia  
 Woodpecker, Hammerhead—Iowa  
 Wren, Black—Texas  
 Wren, Gray—Oregon  
 Wren, Wagtail—North Carolina

The subject is one of peculiar interest and of linguistic value, and all contributors will have the satisfaction of knowing that they are advancing a worthy cause.

W. L. McATEE

*Fish and Wildlife Service*  
*Washington, D. C.*

## OBITUARIES

ROBERT WHITE WILLIAMS, a Life Member of the A. O. U., died on September 19, 1940, from a heart attack. He was elected an Associate in 1900 and to the class of Members in 1918. From the Information Service of the U. S. Department of the Interior, we learn that he was born in East Carroll Parish, Louisiana, on December 5, 1877, the son of Robert Willoughby and Virginia Sutton Williams. His boyhood days were spent in Leon County, Florida, where he attended the Leon County Academy and West Florida Seminary; in 1898 he graduated from the Northern Indiana Law School at Valparaiso. After four years' practice of law at Tallahassee, Florida, he entered the Government service in 1902 as Game Law Assistant, and in 1907, joined the staff of the Solicitor of the U. S. Department of Agriculture. Subsequently, in 1920, he became Solicitor of the Department and nine years later was made supervisor of the National Wildlife Refuges of the Southeastern States, with headquarters at Tallahassee. In 1931, he was transferred to the Washington offices as Assistant U. S. Game-conservation Officer, and four years later was named Senior Biologist in charge of the Section of Importations and Permits, a position which he held until July 1, 1940, when, because of his wide legal background and his ability as an ornithologist, he was made Chief Counsel of the Fish and Wildlife Service.

He contributed many articles on wildlife protection to various periodicals and was co-author of all the annual game-law bulletins of the U. S. Department of Agriculture from 1903-06. He was a member of the Washington Biological Field Club, and of the Baird, the Cooper, and the Wilson Ornithological Clubs. His wife, Norma Clensay Williams, and their two children, Elizabeth M. and Robert W. Williams, survive him. Dr. Ira F. Gabrielson writes: "His associates knew him as a kindly, courteous gentleman whose knowledge of wildlife-conservation laws and codes was more extensive, perhaps, than that of any other person."—G. M. ALLEN.

CHARLES BILL.—June 7 marked the centenary of the birth of Charles Bill, an early Associate of the American Ornithologists' Union, who was born at Ledyard, Connecticut, June 7, 1840. The first sixteen years of his life were spent on his father's farm and after attending the State Normal School at New Britain, for two years, he entered the Norwich Free Academy from which he graduated in 1861. He then took a scientific course at Yale College and graduated in the class of 1865.

Apparently his first business venture was as a book agent at Spartanburg, South Carolina, and after the War he went back to look up those who had befriended him in the South. The years from 1866 to 1869 were spent in Chicago as agent of the publishing firm of Bill and Heron, of which his brother Gurdon was a partner. In the latter year he took up his residence in Springfield, Massachusetts, and with C. A. Nichols, bought out his brother's interest in Gurdon Bill and Co. Under the name of Bill, Nichols and Co., the firm continued until 1873 when Bill disposed of his interest and retired from active business. His retirement at the early age of thirty-three was chiefly due to an accident which overtook him two years before and which permanently injured his health. While looking for a gas leak in an attic he struck a match and the explosion which resulted injured him severely and seriously affected his nervous system. Soon

after this accident he went to Europe and during the last twenty-five years of his life he traveled extensively.

Bill was described as modest, shy and retiring. He never married and never took any active part in public affairs, but was fond of hunting and fishing. Apparently he published nothing on birds but evidently on account of his interest in natural history, he was elected an Associate of the Union in 1889. In the winter of 1896-97 he went south as usual and spent three months at Deland, Florida. Early in April he went to Lithia Springs, Georgia, about fifteen miles from Atlanta where he suffered from a slight throat trouble and a badly ulcerated tooth. On April 14 an operation was performed for the removal of an abscess which had formed in his throat, but blood poisoning had set in and he died at 6.30 a. m., April 15, 1897. His funeral was held in Springfield, Massachusetts, three days later, followed by burial in Oak Grove Cemetery.—T. S. PALMER.

CHARLES EDWARD INGALLS, an Associate of the American Ornithologists' Union for 31 years, died at East Templeton, Massachusetts, May 31, 1917, but no notice of his activities has thus far appeared in 'The Auk.' He was born at East Templeton, September 21, 1851, the son of Lemuel and Eunice Richardson Ingalls, and was a contemporary of Brewster, Deane, Henshaw and Merrill, in fact he was but twelve days younger than Ruthven Deane. In 1885, at the third meeting of the Union, he was elected an Associate and his name was carried on its rolls for nearly half of his life. He attended the schools of Templeton but otherwise was self-educated.

Outside of his occupation as a salesman, Ingalls was primarily a collector and was especially interested in oology and in making observations on the nesting habits of birds. One year he spent in Alaska. Apparently he published little, beyond brief articles in 'Forest and Stream,' the 'American Bird Magazine' and the 'Philadelphia Weekly Press,' but two of his notes appeared in 'The Auk' a few years after his election. One of these related to a record of *Icterus galbula* in Massachusetts and the other to the breeding of the Red-breasted Nuthatch near his home. Both records are included in Forbush's 'Birds of Massachusetts.' He also published in the local newspaper ('Gardner Journal') a list of the birds of his vicinity, and in 1904 reprinted from the same journal, 'A Revised List of the Birds of Templeton and Adjoining Towns.' After his death, most of his collection was given to the Monadnock Council of Boy Scouts at Camp Collier, Gardner, but some sixty birds, including a Passenger Pigeon, are still in the possession of his son, George C. Ingalls, at East Templeton, to whom we owe the information.—T. S. PALMER.

BRUNO LILJEFORS, considered the greatest of contemporary animal painters, died on December 18, 1939, at an age of almost eighty years. He was born in Uppsala, Sweden, on May 14, 1860, and, except for visits to other parts of Europe, his life was spent mainly in Sweden.

Liljefors was an artist first and an ornithologist afterward. In this respect he contrasted markedly with such men as Fuertes or Charles Livingstone Bull, who both admired him greatly. He began to draw animals before the age of twelve and was nineteen when he entered the Royal Academy of Arts in Stockholm. After three years he left there, since he had tired of painting from plaster casts and had a strong desire to paint his living animal models at home in Uppsala. This ended his formal training.

With the exception of the winter of 1888-89, which was spent teaching in Gothenburg, Liljefors lived mainly in the country. Here he painted directly from Nature. He changed his residence several times in order to get different landscapes for his studies. From 1894-1905 he lived among the islands off the Swedish coast, painting the migratory birds there; from 1905-17 he lived at Jarna Bay; and thereafter at Österby Castle near Dannemora. His pictures are to be found in most foreign art museums and in a number of private collections and public galleries in the United States.

Some of the best known works of Liljefors were reproduced in a book of his pictures, 'Ute I Markerna' (Bonniers, Stockholm, 1922). The artist wrote the introduction to this book, which is frequently quoted. He later supplied both text and pictures for a handsome volume, 'Det Vildas Rike' (Bonniers, Stockholm, 1934). K. E. Russow has written an illustrated monograph, 'Bruno Liljefors: An Appreciation' (C. E. Fritze, Stockholm, 1929), which is available with text in English.—RALPH S. PALMER.



THE FIFTY-EIGHTH STATED MEETING OF THE  
AMERICAN ORNITHOLOGISTS' UNION

BY LAWRENCE E. HICKS

THE eleventh meeting to be held in Massachusetts took place September 9-15, 1940, at Boston and Cambridge. Headquarters were at the Hotel Statler in Boston and most of the business sessions were held there. The public sessions were held in the New England Museum of Natural History, Tuesday morning; in the Hotel Statler, Tuesday afternoon, and in the Institute of Geographical Exploration of Harvard University in Cambridge, on Wednesday and Thursday.

*Business Sessions.*—The meetings on Monday, September 9, included two sessions of the Council, a meeting of the Fellows at 4 p. m., and a meeting of the Fellows and Members at 8 p. m. The evening business session was attended by 23 Fellows and 32 Members—a total of 55 present.

There were elected two Fellows, one Corresponding Fellow, one Patron, eight Members and 195 Associates. On October 1, 1940, vacancies in the various membership classes were as follows: Fellows, 3; Honorary Fellows, 3; Corresponding Fellows, 18; Members, 19.

The Treasurer's preliminary report was accepted and the meeting authorized the Finance Committee (acting without the Treasurer) to review and approve the final audited report which would be available at the end of the current fiscal year (September 30). This final report (approved November 30) appears farther on.

The Treasurer stated that corresponding expenses were even lower than in 1939 when they were about 25% lower than in 1938. Various economy and efficiency measures promise to give the A. O. U. a balanced budget by the time of the 1941 Denver meeting. The Trustees' report showed that the Endowment Funds, totalling \$29,618.12, were in good condition.

The Secretary's report indicated that on August 1, 1940, the paid-up members of the Union were as follows: Associates, 1,386; Members, 126; Fellows, 46; Patrons, 2; Fellows Emeriti, 3; Honorary Fellows, 22; Associates-elect, 74. Total, including 81 Corresponding Fellows, 1,740. In addition there were 215 subscribers. This represents a good increase, compared with the previous year, in both the number of Associates and subscribers. Twenty-nine resignations had been accepted during the year and 195 Associates elected. Roll call was held for the 24 members deceased since the last meeting: 1

Patron, 3 Fellows, 1 Honorary Fellow, 2 Corresponding Fellows, 3 Members and 14 Associates.

The retiring members of the Council (Hoyes Lloyd, Dr. Robert C. Murphy and Dr. Theodore S. Palmer) were replaced for three-year terms by James Savage, Dr. J. Van Tyne, and Dr. Ira N. Gabrielson. All of the other officers were re-elected.

Three new amendments to the By-laws, first proposed at the 1939 meeting, were passed. These (1) grant affiliated ornithological societies meeting specific qualifications a voting representative on the A. O. U. Council, (2) provide for the appointment of a nominating committee of three Fellows on staggered terms to supplement the present method of nominating Fellows, Members, Honorary Fellows and Corresponding Fellows, and (3) make the cost of all new life memberships \$100 (regardless of membership class). A proposal to raise the annual dues of all members to four dollars was defeated. A new amendment, to be given final consideration at the Denver meeting in 1941, makes all publications issued during the *six calendar years* preceding a given A. O. U. meeting, eligible for Brewster Medal awards.

The Council voted to limit each edition of 'The Auk' to 300 copies in excess of current needs and to use no colored plates in 'The Auk' in 1941 unless contributed.

The consolidation of the six A. O. U. endowment funds into a single fund was completed upon confirmation of the mail vote which the Council made in February 1940, following a favorable recommendation made by the Finance Committee, the Endowment Committee and the Investing Trustees.

The 1940 award of the Brewster Medal was made to James Lee Peters in recognition of his four volumes of 'The Birds of the World' which have appeared to date (all except Vol. 1 within the prescribed six-year period).

The present Trustees (George Stuart III, C. H. Riker and Edward Norris) were re-elected, as was George Willett as Editor of the Ten-Year Index of 'The Auk.'

The Union voted to accept the report of the Committee on Bird Protection (Victor Cahalane, William Finley, Clarence Cottam and Aldo Leopold). The full report will appear in a later issue of 'The Auk.'

The Union adopted the report of the Resolutions Committee (Hoyes Lloyd, Alexander Wetmore and James L. Peters). This expressed appreciation to the following for their contributions to the 1940 meeting: the Local Committee (J. L. Peters, Chairman, A. C.

Bagg, C. F. Batchelder, T. Barbour, R. J. Eaton, C. B. Floyd, D. L. Garrison, L. Griscom, R. Lawson, C. R. Mason and W. R. Peabody), the officers of the Union, the Nuttall Ornithological Club, the Ladies' Entertainment Committee, the officials of the New England Museum of Natural History and of the Institute of Geographical Exploration and the Museum of Comparative Zoölogy of Harvard University, to numerous other ornithologists of New England who added to the success of the meeting, and to Ludlow Griscom, Drs. Oliver L. Austin (father and son), and others who executed such splendid arrangements for the field excursions to Plum Island, and to Chatham, Eastham, Monomoy Point and other stations on Cape Cod.

*Public Meetings.*—The public meetings opened on Tuesday morning with an address of welcome by H. Bradford Washburn, Jr., Director of the New England Museum of Natural History, and a response by President James P. Chapin. The program included 38 papers, five of which were read by title, and as usual covered a wide range of subjects, both popular and technical. Classified as to content the papers covered the following subjects: life history, 9; behavior, 9; faunal, 8; conservation or education, 4; biography, 4; distribution and migration, 4; bird-banding, 4; exploration, 3; techniques, 3; taxonomy, 2; anatomy and physiology, 2; management, 2; waterfowl, 1.

*Social Events.*—On Tuesday evening, 198 persons attended a buffet supper at an open house at the New England Museum of Natural History. This event afforded a welcome opportunity for visits with friends while reviewing the interesting vertebrate collections and bird paintings. Wednesday evening was occupied by the annual dinner at the Hotel Statler with 167 present. The highlight of the evening was the showing by John H. Storer of a marvelous color film of birds of the Southeast and mammals of the North Country in slow motion. Wednesday noon a group photograph was taken of the 152 members present at that time (for a key to the photograph apply to the Secretary).

*Excursions.*—Friday, September 13, 105 persons participated in an all-day field trip along the New England coast north of Boston in the Plum Island area. Shorebirds, including curlews and willets, gulls, terns and ducks, were seen in numbers along sandy beaches or feeding on tidal flats. On Saturday, September 14, a party of forty traveled to Chatham on Cape Cod, visiting Eastham to enjoy the hospitality of the Austins and view the various types of bird traps and bird nets in action at the nation's largest bird-banding station.

Many studied the system used in filing banding data or inspected the extensive library and other research facilities.

Sunday morning, twenty fortunate members of the group chartered a boat which took the party several miles to sea where various oils and meats were used to induce numbers of pelagic birds to approach the boat within easy range for photography. These included jaegers, gulls and shearwaters. At noon the entire party assembled on Monomoy Point to be transported by balloon-tired beach wagons to numerous ponds, pools, beaches and a most suprising white-cedar bog to observe both plant and animal life quite unusual to the many visitors coming from localities west of the Atlantic Coast.

### THE PROGRAM

Papers are arranged in the order in which they were presented at the meeting. Starred papers were illustrated by lantern slides; those with a double star were illustrated by motion pictures.

### TUESDAY MORNING

Welcome by H. BRADFORD WASHBURN, JR., Director of the New England Museum of Natural History.

Response by JAMES P. CHAPIN, President, American Ornithologists' Union.

Roll Call of Fellows and Members, Report of the Business Meeting, Announcement of the result of elections.

Report of the Local Committee on Arrangements: J. L. PETERS, Museum of Comparative Zoology, *Chairman*, LUDLOW GRISCOM, Museum of Comparative Zoology, in charge of field trips.

1. The Curious Migration of a South American Flycatcher. JOHN T. ZIMMER, American Museum of Natural History, New York, N. Y.
2. The Brazilian Frontier of the Guianas. EMMET REID BLAKE, Field Museum of Natural History, Chicago.
3. Experiments on Enemy Recognition in the Song Sparrow. MARGARET M. NICE and JOOST TER PELKWIJK, 5708 Kenwood Avenue, Chicago, and Dept. of Zoology, University of Chicago.
4. Migratory Movements of Some Yucatan Birds. J. VAN TYNE, Museum of Zoology, Ann Arbor, Michigan, and MILTON B. TRAUTMAN, Stone Laboratories, Put-in-Bay, Ohio.
5. \*Recent Progress in Bird Sound Recording — phonograph records. PAUL KELLOGG, Cornell University, Ithaca, New York.
6. The Post-Glacial History of *Zonotrichia capensis*: Summary. FRANK M. CHAPMAN, American Museum of Natural History, New York City (read by JAMES P. CHAPIN).
7. In Memoriam: Otto Widmann. T. S. PALMER, 1939 Biltmore St., N. W., Washington, D. C. (Read by title.)
8. In Memoriam: Gurdon Trumbull. W. L. MCATEE, 3200 22nd St., N. W., Arlington, Virginia. (Read by title.)
9. In Memoriam: James Henry Fleming. PERCY A. TAVERNER, National Museum, Ottawa, Ontario, Canada. (Read by title.)

## TUESDAY AFTERNOON

10. \*The Effect of Soil-conservation Practices on Songbird Populations in the Northeast. FRANK C. EDMISTER, Upper Darby, Pennsylvania.
11. \*Campaigning in South America. T. GILBERT PEARSON, International Committee for Bird Preservation, National Association of Audubon Societies, 1006 Fifth Avenue, New York City.
12. \*Social Organization and Territory of Geese. DALE W. JENKINS, Ridgway Fellow, Univ. of Chicago, Chicago, Illinois.
13. \*\*Color Films of Birds observed on Field Trips in the Denver Region. ALFRED M. BAILEY, Colorado Museum of Natural History, Denver, Colorado.
14. \*\*From Coast to Coast with a Color Camera. ARTHUR A. ALLEN, Cornell University, Ithaca, New York.
15. Preliminary Observations on Richardson's Grouse (*Dendragapus obscurus richardsoni*) in Eastern Oregon. A. SIDNEY HYDE, La Grande, Oregon. (Read by title.)
16. Nesting Habits of the Yellow Rail in Gaspé, Quebec. L. MCL. TERRILL, Westmount, Quebec. (Read by title.)

## WEDNESDAY MORNING

17. Notes on the John Abbot Drawings. MRS. ARTHUR A. ALLEN, Cornell University, Ithaca, New York.
18. "Compensation" Reactions in Birds—charts. RALPH S. PALMER, Cornell University, Ithaca, New York.
19. \*Notes on the Life History of the Pileated Woodpecker. J. SOUTHGATE Y. HOYT, Lexington, Virginia.
20. \*Nesting Observations on the Common Redpoll at Churchill, Manitoba. LAWRENCE I. GRINNELL, Ithaca, New York.
21. \*Long-distance Homing of Gulls and Terns. DONALD R. GRIFFIN, Biological Laboratories, Harvard University, Cambridge, Massachusetts.
22. Winter Studies of Color-banded Chickadees. GEORGE JOHN WALLACE, LENOX, Massachusetts.
23. \*Territory and Nesting of the Black-capped Chickadee. EUGENE P. ODUM, Biological Research Division, Edmund Niles Huyck Preserve, Rensselaerville, New York.
24. \*The Peregrine Falcon Population East of the Rocky Mountains. JOSEPH J. HICKEY, National Association of Audubon Societies, New York City. (Read by ALEXANDER SPRUNT.)
25. An Ecological Survey of the Birds of Reese's Bog, Cheboygan County, Michigan. HARRY H. WILCOX, JR., Madison Court, Ann Arbor, Michigan.
26. Effect of Artificial Light upon Reproductive Activity in Wild Ducks. HARRY LEON KUTZ, Cornell University, Ithaca, New York.

## WEDNESDAY AFTERNOON

27. \*\*Current Status of Certain Rare Species of American Birds. JOHN H. BAKER, National Association of Audubon Societies, New York City.
28. \*\*A Season with the Birds of the Finger Lakes Region. ARTHUR A. ALLEN, Cornell University, Ithaca, New York.
29. \*\*Seabirds of the West Indies: Results of the Mandel Caribbean Expedition. RUDYERD BOULTON, Field Museum of Natural History, Chicago, Illinois.



30. \*\*Migration of Kent Island Gulls. ALFRED O. GROSS, Bowdoin College, Brunswick, Maine.

THURSDAY MORNING

31. \*Accurate Publication. MAY THACHER COOKE, Washington, D. C.  
32. Notes on the Behavior of the Common Tern. CHARLES H. ROGERS, Museum of Zoology, Princeton, New Jersey.  
33. The Taxonomic Significance of the Nidification of some Passerine Birds. JAMES BOND, Academy of Natural Sciences, Philadelphia, Pennsylvania.  
34. \*Age and Seasonal Variations in the Physiology of Wild Chickadees. EUGENE P. ODUM, Biological Research Division, Edmund Niles Huyck Preserve, Rensselaerville, New York.  
35. \*Photographing the Cowbird while laying in Nests of the Ovenbird. H. W. HANN, Zoology Department, University of Michigan, Ann Arbor, Michigan.  
36. \*\*An Analysis of the Social Behavior of the Laughing Gull. G. KINGSLEY NOBLE and M. WURM, American Museum of Natural History, New York City.  
37. \*\*Trumpeter Swans and Other Interesting Birds on National Refuges. W. F. KUBICHEK, Fish and Wildlife Service, Washington, D. C.  
38. \*\*The Ways of Birds: A. Some Examples of Nesting and Deportment. B. Some Examples of Feeding and Flight. RANDOLPH ASHTON, Morrisville, Pennsylvania.

THURSDAY AFTERNOON

39. \*\*The Raven on Mount Desert Island. MAURICE SULLIVAN, National Park Service, Bar Harbor, Maine.  
40. \*\*Color Studies from a Southern Blind. ALLAN D. CRUICKSHANK, National Association of Audubon Societies, 1006 Fifth Avenue, New York City.  
41. \*\*Grouse Courtships in Color. CLEVELAND P. GRANT, Covington, Kentucky.  
42. \*\*Mid-Western Waterbirds in Color. OLIN SEWALL PETTINGILL, JR., Carleton College, Northfield, Minnesota, and University of Michigan Biological Station, Cheboygan, Michigan.  
43. \*\*Night Animals in Motion Pictures: Further Studies. HOWARD H. CLEAVES, Prince Bay, Staten Island, New York.

ATTENDANCE

The 1940 meeting, the eleventh to be held in the Boston area, had a registered attendance of 180 members (all classes) and 117 visitors—a total of 297. The list of those present in 1940 included 1 Patron, 24 Fellows, 38 Members and 117 Associates.

Members were present from 28 States and Provinces; 127 members and 44 visitors registered from localities outside of Massachusetts. Exclusive of visitors the eight largest delegations were: Massachusetts 52, New York 33, Washington, D. C., 18, Ohio 9, Ontario 8, Pennsylvania 8, Illinois 7 and New Hampshire 7.

The six members traveling the greatest distances were: William H. Phelps, Caracas, Venezuela; George Willett, Los Angeles, California; Alfred M. Bailey, Fred G. Brandenburg and Robert J. Niedrach, Denver, Colorado; Herbert Stoddard, Thomasville, Georgia.

CALIFORNIA, 1—*Fellow*, George Willett, Los Angeles.

COLORADO, 3—*Member*, Alfred M. Bailey, Denver. *Associates*, Fred G. Brandenburg, Robert J. Niedrach, Denver.

CONNECTICUT, 3—*Associates*, Margaret Brooks, Old Greenwich; S. Dillon Ripley, Litchfield; L. W. Smith, Meriden.

GEORGIA, 1—*Fellow*, Herbert Stoddard, Thomasville.

ILLINOIS, 7—*Patron*, Mrs. Ruthven Deane, Winnetka. *Fellow*, Margaret M. Nice, Chicago. *Members*, Emmet R. Blake, Rudyerd Boulton, Chicago; Stephen S. Gregory, Winnetka. *Associates*, Mrs. Herman D. Smith, Lake Forest; Melvin A. Traylor, Chicago.

IOWA, 1—*Associate*, George Tonkin, Des Moines.

KENTUCKY, 1—*Associate*, Robert M. Mengel, Glenview.

MAINE, 4—*Fellow*, Alfred O. Gross, Brunswick. *Member*, Arthur H. Norton, Portland. *Associates*, Ralph S. Palmer, Brunswick; John Pearse, Orono.

MARYLAND, 1—*Associate*, Eleanor Cooley, Berwyn.

MASSACHUSETTS, 52—*Fellows*, Glover M. Allen, Cambridge; A. C. Bent, Taunton; Ludlow Griscom, Cambridge; James L. Peters, Harvard. *Members*, Francis H. Allen, West Roxbury; Oliver L. Austin, Jr., Wellfleet; J. C. Greenway, Jr., Cambridge; S. Gilbert Emilio, Salem; Joseph A. Hagar, Marshfield Hills; John B. May, Cohasset; Winsor M. Tyler, Brighton. *Associates*, Donald C. Alexander, Lowell; Virginia Armstrong, Concord; Harold H. Blanchard, Winchester; John W. Brainerd, Dover; Earle A. Brooks, Newton Highlands; Lawrence B. Chapman, Wellesley; Roland C. Clement, Fall River; George W. Cottrell, Belmont; Mrs. Prince S. Crowell, Franklin; Morton E. Cummings, Malden; Bertha E. Davis, Brookline; Samuel S. Dearborn, Cambridge; Grace I. Dickenson, Worcester; Samuel A. Eliot, Jr., Brookline; Theodore L. Eliot, Brookline; Mrs. Mena V. French, Wayland; David L. Garrison, West Newton; Norman H. Giles, Jr., Cambridge; Donald R. Griffin, Cambridge; John A. Griswold, Jr., Cambridge; Katherine C. Harding, Cohasset; George B. Hendricks, Pittsfield; Louisa Hunnewell, Wellesley; Francis L. Jackson, Chestnut Hill; Juliet R. Kellogg, Andover; Ralph Lawson, Salem; George B. Lay, Boston; Nathaniel C. Nash, IV, Cambridge; Florence M. Pease, Conway; George L. Perry, Somerville; Frederick A. Saunders, Cambridge; John H. Storer, Waltham; Wendell Taber, Cambridge; Katherine Tousey, Somerville; John Van Schaick, Jr., Boston; Robert Walcott, Marblehead; George J. Wallace, Lenox; Mrs. Kenneth B. Wetherbee, Worcester; William P. Wharton, Groton; Charles L. Wheeler, Hatchville; James D. Whitaker, Wellesley Hills.

MICHIGAN, 4—*Fellow*, J. Van Tyne, Ann Arbor. *Member*, Picce Brodkorb, Ann Arbor. *Associates*, Mrs. Edith K. Frey, Jackson; Harry W. Hann, Ann Arbor.

MINNESOTA, 1—*Member*, Olin S. Pettingill, Jr., Northfield.

NEBRASKA, 1—*Associate*, R. Allyn Moser, Omaha.

NEW HAMPSHIRE, 7—*Member*, Francis B. White, Concord. *Associates*, George C. Atwell, Strafford; Mrs. C. H. Forsyth, Hanover; Cleveland P. Grant, Jaffrey; Frederick P. Lord, Nina G. Spaulding, Richard Weaver, Hanover.

NEW JERSEY, 4—*Members*, B. S. Bowdish, Demarest; Charles H. Rogers, Princeton. *Associates*, Alfred E. Eynon, Newark; William F. Rapp, Jr., New Brunswick.

NEW YORK, 33—*Fellows*, Arthur A. Allen, Ithaca; James P. Chapin, Ernst Mayr, New York City; George M. Sutton, Ithaca; John T. Zimmer, New York City. *Members*, Oliver L. Austin, Tuckahoe; Paul Kellogg, Ithaca; Mrs. Walter W. Naumberg, John T. Nichols, T. Gilbert Pearson, Roger T. Peterson, Austin L.

- Rand, New York City; James Savage, Buffalo; Dayton Stoner, Albany. *Associates*, Mrs. Arthur A. Allen, Ithaca; Dean Amadon, John H. Baker, New York City; Hugh Birkhead, Pelham Manor; Charles S. Brand, Ithaca; Carl W. Buchheister, Ruth Trimble Chapin, New York City; Howard H. Cleaves, Staten Island; Allen D. Cruickshank, New York City; Lawrence I. Grinnell, Ithaca; Everett W. Jameson, Buffalo; Edmund R. P. Janvrin, New York City; Harry L. Kutz, Ithaca; Harold D. Mitchell, Buffalo; Walter W. Naumberg, Theodora Nelson, G. Kingsley Noble, New York City; Eugene P. Odum, Rensselaerville; Ruth D. Turner, Ithaca.
- NORTH DAKOTA, 1—*Associate*, C. J. Henry, Upham.
- OHIO, 10—*Members*, Lawrence E. Hicks, Columbus; Milton B. Trautman, Put-in-Bay. *Associates*, John W. Aldrich, Herbert W. Brandt, Cleveland; Grant M. Cook, Youngstown; Dale W. Jenkins, Columbus; William C. Herman, Cincinnati; Vincent P. McLaughlin, Youngstown; Norman A. Preble, Columbus; Charles F. Walker, Put-in-Bay.
- ONTARIO, 8—*Fellows*, Hoyes Lloyd, P. A. Taverner, Ottawa. *Member*, Rudolph M. Anderson, Ottawa. *Associates*, Otto E. Devitt, Toronto; Mrs. Hoyes Lloyd, Ottawa; George W. North, Hamilton; J. Murray Speirs, Mrs. J. Murray Speirs, Toronto.
- PENNSYLVANIA, 8—*Members*, James Bond, J. Fletcher Street, Philadelphia. *Associates*, Randolph Ashton, Morrisville; Mrs. Francis H. Coffin, Scranton; Frank C. Edminster, Lansdowne; Robert W. Glenn, Pittsburgh; Dale Rudert, Saxonburg; Harry T. Underdown, Elkins Park.
- QUEBEC, 1—*Associate*, Jules A. Decarie, Montreal.
- RHODE ISLAND, 5—*Associates*, David L. Emerson, Providence; Harold Gibbs, Barrington; Herbert E. Walter, Mrs. Herbert E. Walter, Providence; Philip C. Walton, Kingston.
- SOUTH CAROLINA, 1—*Member*, Alexander Sprunt, Jr., Charleston.
- VERMONT, 2—*Member*, Wendell P. Smith, Wells River. *Associate*, Mrs. Howard A. Drew, Baite.
- VIRGINIA, 1—*Associate*, J. Southgate Y. Hoyt, Lexington.
- WASHINGTON, D. C., 18—*Fellows*, Herbert Friedmann, Ira N. Gabrielson, Frederick C. Lincoln, W. L. McAtee, H. C. Oberholser, T. S. Palmer, Edward A. Preble, Alexander Wetmore. *Members*, Vernon Bailey, May T. Cooke, Clarence Cottam, Herbert G. Deignan, Wesley F. Kubichek. *Associates*, Charles H. M. Barrett, Phoebe Knappen, William H. Lawrence, Robert C. McClanahan, Mrs. T. S. Palmer.
- WISCONSIN, 1—*Associate*, Walter J. Mueller, Milwaukee.
- VENEZUELA, 1—*Associate*, William H. Phelps, Caracas.

#### ELECTION OF OFFICERS

The election of officers for 1941 resulted as follows: *President*, J. P. Chapin; *Vice-Presidents*, J. L. Peters and George Willett; *Secretary*, Lawrence E. Hicks; *Treasurer*, Rudyerd Boulton; *Members of the Council* (in addition to officers and ex-presidents), for three years, James Savage, J. Van Tyne and Ira N. Gabrielson.

The Council elected Glover M. Allen, Editor of 'The Auk'; Rudyerd Boulton, Business Manager; George H. Stuart, 3d, C. H. Riker and Edward Norris, Trustees; and J. P. Chapin, S. S. Gregory, Jr., Rudyerd Boulton, W. L. McAtee, Lawrence E. Hicks and Ludlow Griscom, members of the Finance Committee.

## ELECTION OF FELLOWS, MEMBERS AND ASSOCIATES

PATRON, 1—Mrs. Witmer Stone, Philadelphia, Pennsylvania (a posthumous election).  
FELLOWS, 2—Stanley G. Jewett, Portland, Oregon, and Robert T. Moore, Pasadena, California.

CORRESPONDING FELLOW, 1—Dr. Oliverio Pinto, São Paulo, Brazil.

MEMBERS, 8—Oliver L. Austin, Sr., Tuckahoe, N. Y.; Joseph J. Hickey, New York City; George H. Lowery, Jr., Baton Rouge, Louisiana; Eugene E. Murphey, Augusta, Georgia; John R. Pemberton, Altadena, California; Arlie W. Schorger, Madison, Wisconsin; Milton B. Trautman, Put-in-Bay, Ohio; Lawrence H. Walkinshaw, Battle Creek, Michigan.

ASSOCIATES, 195.—The names of the Associates who have qualified will appear in the membership list in 'The Auk' for October, 1941.

## DECEASED MEMBERS

During the year the Union lost 24 members by death: 1 Patron, 3 Fellows, 1 Honorary Fellow, 2 Corresponding Fellows, 3 Members and 14 Associates.

MRS. WITMER STONE (LILLIE M. LAFFERTY STONE), Patron (1920), aged 68, died at Philadelphia, Pennsylvania, on August 3, 1940.

JAMES HENRY FLEMING, Fellow (1893), aged 67, died at Toronto, Ontario, on June 27, 1940.

PROF. FRANCIS HOBART HERRICK, Fellow (1913), died in his 82d year, at Cleveland, Ohio, on September 11, 1940.

ARTHUR HOLMES HOWELL, Fellow (1889), aged 68, died at Washington, D. C., on July 10, 1940.

REV. FRANCIS CHARLES ROBERT JOURDAIN,<sup>1</sup> Honorary Fellow (1918), aged 75, died at Bournemouth, England, on February 27, 1940.

GEORGE LATIMER BATES, Corresponding Fellow (1919), died in his 77th year, at Chelmsford, England, on January 31, 1940.

PROF. ALIPIO DE MIRANDA RIBEIRO, Corresponding Fellow, died in his 65th year, at Rio de Janeiro, Brazil, on January 8, 1939.

FRANK BOND, Member (1887), aged 84, died at Washington, D. C., on July 22, 1940.

ALBERT RICH BRAND, Life Member (1929), died in his 51st year, at New York City, in May, 1940.

ROBERT WHITE WILLIAMS, Life Member (1900), died in his 63d year, at Washington, D. C., on September 19, 1940.

DR. ZABDIEL BOYLSTON ADAMS,<sup>2</sup> Associate (1908), died in his 65th year at Brookline, Massachusetts, on March 16, 1940.

FRANKLIN BENNER,<sup>3</sup> Associate (1883), aged 85, died at Minneapolis, Minnesota, on April 13, 1938.

MRS. EDWIN TYLER BLAKE, Associate (1927), died at Berkeley, California, October 6, 1936.

MRS. EMILY ROBINSON (HENRY MARTYN) BRACKEN, Honorary Life Associate (1897), died in her 85th year, at Claremont, California, on February 3, 1940.

JOSEPH FRANKLIN FRAZIER, Associate (1928), died in his 74th year, at Independence, Missouri, on March 30, 1940.

<sup>1</sup> For obituary notice, see Auk, 57: 445, 1940.

<sup>2</sup> " " " " Auk, 57: 446, 1940.

<sup>3</sup> " " " " Auk, 57: 137-138, 1940.

- EDWARD GRUETT KENT, Associate (1919), died in his 66th year, at Madison, New Jersey, on March 25, 1940.
- CHARLES KENNEDY KNICKERBOCKER, Associate (1922), died in his 66th year, at Chicago, Illinois, in 1940.
- GUSTAVE ADOLPHE LANGELIER, Associate (1923), aged 66, died at Sainte-Foy, Quebec, on April 23, 1940.
- DR. WALTER HARRINGTON McCracken,<sup>4</sup> Associate (1931), aged 70, died at Detroit, Michigan, on March 3, 1940.
- POMPEO MARGHERITA MARESI, Associate (1929), aged 51, died at Scarsdale, New York, August 12, 1940.
- RODMAN ARMITAGE NICHOLS,<sup>5</sup> Associate (1919), aged 56, died at Salem, Massachusetts, on May 27, 1940.
- ANTHONY WAYNE ROBINSON, Associate (1903), aged 78, died at Haverford, Pennsylvania, on November 30, 1939.
- DR. ARTHUR CAMP STANLEY,<sup>6</sup> Associate (1925), died in his 57th year, at Washington, D. C., on April 30, 1940.
- WILFRED AUGUST WELTER,<sup>7</sup> Associate (1930), died in his 34th year from an auto accident near Kankakee, Indiana, while en route from Kentucky to Minnesota, on December 20, 1939.

<sup>4</sup> For obituary notice, see Auk, 57: 446, 1940.

<sup>5</sup> " " " " Auk, 57: 599, 1940.

<sup>6</sup> " " " " Auk, 57: 599, 1940.

<sup>7</sup> " " " " Auk, 57: 448, 1940.



**FINANCIAL REPORT OF THE TREASURER FOR THE YEAR ENDED  
SEPTEMBER 30, 1940**

|   | RECEIPTS                                 |  |
|---|--|--|
|   | <i>For Year ended<br/>Sept. 30, 1940</i> | <i>For Year ended<br/>Sept. 30, 1939</i> |
| <b>Membership dues:</b>                     |  |  |
| Current year . . . . .                      | \$3,972.00                               | \$4,300.00                               |
| Previous years . . . . .                    | 95.50                                    | 130.00                                   |
| In advance . . . . .                        | 1,368.00                                 | 432.00                                   |
|   | <hr/> \$5,435.50                         | <hr/> \$4,862.00                         |
| <b>Subscriptions to 'The Auk':</b>          |  |  |
| Associates-elect . . . . .                  | 219.00                                   | 219.00                                   |
| Institutions . . . . .                      | 559.25                                   | 612.69                                   |
| Other individuals . . . . .                 | 76.19                                    | 51.05                                    |
|   | <hr/> 854.44                             | <hr/> 882.74                             |
| <b>Sales of publications:</b>               |  |  |
| Back numbers of 'The Auk' . . . . .         | 659.23                                   | 277.53                                   |
| 'Check-list,' 4th edition . . . . .         | 292.00                                   | 336.40                                   |
| Miscellaneous . . . . .                     | 345.82                                   | 213.88                                   |
|   | <hr/> 1,297.05                           | <hr/> 827.81                             |
| <b>Contributions to:</b>                    |  |  |
| Publication of 'The Auk' . . . . .          | 141.85                                   | 190.05                                   |
| General expense . . . . .                   | 26.00                                    | —  |
| Endowment Fund . . . . .                    | 50.00                                    | 150.00                                   |
| Local Committee's expenses . . . . .        | —  | 150.00                                   |
|   | <hr/> 217.85                             | <hr/> 490.05                             |
| <b>Life Membership fees . . . . .</b>       | <b>50.00</b>                             | <b>225.00</b>                            |
|   | <hr/> 50.00                              | <hr/> 225.00                             |
| <b>Income from investments:</b>             |  |  |
| Life Membership Fund . . . . .              | 610.37                                   | 577.12                                   |
| William Brewster Fund . . . . .             | 298.68                                   | 249.37                                   |
| Ruthven Deane Fund . . . . .                | 184.42                                   | 137.03                                   |
| <b>Educational Fund</b>                     |  |  |
| Accumulated . . . . .                       | 219.96                                   | —  |
| Current . . . . .                           | 11.92                                    | —  |
| <b>Bird Protection Fund</b>                 |  |  |
| Accumulated . . . . .                       | 106.87                                   | —  |
| Current . . . . .                           | 56.43                                    | —  |
|   | <hr/> 1,488.65                           | <hr/> 963.52                             |
| <b>Total receipts for fiscal year . . .</b> | <b>\$9,343.49</b>                        | <b>\$8,251.12</b>                        |
|   | <hr/> <hr/>                              | <hr/> <hr/>                              |

## DISBURSEMENTS

|  | <i>For Year ended<br/>Sept. 30, 1940</i> | <i>For Year ended<br/>Sept. 30, 1939</i> |
|--|--|--|
| Cost of publishing "The Auk"                         |  |  |
| April, 1938 (balance).....                           | —  | \$ 530.00                                |
| July.....  | \$ 987.15                                | 1,590.98                                 |
| October.....   | 1,129.16                                 | 1,310.73                                 |
| January.....   | 1,047.57                                 | 941.36                                   |
| April.....   | 1,130.11                                 | 1,087.23                                 |
| July, 1940.....                                      | 1,183.02                                 | —  |
|  | <u>\$5,477.01</u>                        | <u>\$5,460.70</u>                        |
| Editor's honorarium.....                             | 600.00                                   | 600.00                                   |
|  | 600.00                                   | 600.00                                   |
| Editor's expenses.....                               | —  | 16.28                                    |
|  | —  | 16.28                                    |
| Reserve stock of publications                        |  |  |
| Services, postage, supplies.....                     | 117.19                                   | 92.95                                    |
| Constructing storage cabinet.....                    | 71.35                                    | 13.17                                    |
| Inventory in New York.....                           | —  | 216.79                                   |
|  | 188.54                                   | 322.91                                   |
| Purchase of back numbers of "The Auk"                | 209.38                                   | 89.00                                    |
|  | 209.38                                   | 89.00                                    |
| Expenses of Treasurer & Bus. Mgr.                    |  |  |
| Secretarial.....                                     | 595.05                                   | 596.40                                   |
| Office expense & supplies.....                       | 180.48                                   | 198.77                                   |
| Postage & express.....                               | 190.28                                   | 205.03                                   |
| Telephone & telegraph.....                           | 7.62                                     | 7.51                                     |
| Furniture & fixtures.....                            | 11.25                                    | 58.97                                    |
| Bank charges & foreign exchange....                  | 71.64                                    | 32.31                                    |
| Miscellaneous.....                                   | 25.46                                    | 2.17                                     |
|  | 1,081.78                                 | 1,101.16                                 |
| Expenses of Secretary                                |  |  |
| Secretarial.....                                     | 42.60                                    | 61.30                                    |
| Washington meeting expense.....                      | —  | 33.00                                    |
| Facsimile of minute books.....                       | 91.59                                    | —  |
| Postage & telephone.....                             | 38.21                                    | 82.34                                    |
| Printing.....  | 45.54                                    | 100.50                                   |
|  | 217.94                                   | 277.14                                   |
| Brewster Memorial Award                              |  |  |
| Cost of medal.....                                   | 15.00                                    | 200.47                                   |
| Honorarium.....                                      | 283.68                                   | 48.90                                    |
|  | 298.68                                   | 249.37                                   |
| Addition to principal of general endow-<br>ment..... | 250.00                                   | 225.00                                   |
|  | 250.00                                   | 225.00                                   |
| Contributions:                                       |  |  |
| Zoological Society, London.....                      | 25.00                                    | 25.00                                    |
| Int. Com. on Nomenclature.....                       | 10.00                                    | 10.00                                    |
| Expenses of Local Committee.....                     | 150.00                                   | 150.00                                   |
|  | 185.00                                   | 185.00                                   |
| Total disbursements for fiscal year                  | <u>\$8,508.33</u>                        | <u>\$8,526.56</u>                        |

| RECAPITULATION                          |    |          |                       |
|---|----|----------|-----------------------|
| Accounts payable Sept. 30, 1940.....    | \$ | 0.00     |                       |
| Dues collected in advance.....          |    | 1,368.00 |                       |
|   |    |          | \$1,368.00 \$1,368.00 |
| Cash on hand and in bank.....           |    | 976.52   |                       |
| Restricted funds.....                   |    | 395.18   |                       |
|   |    |          | 581.34                |
| Accounts receivable Sept. 30, 1940..... |    |          | 40.66                 |
|   |    |          | 622.00                |
| Deficit, September 30, 1940.....        | \$ |          | 746.00                |

A committee consisting of Messrs. Chapin, McAtee, Hicks, Gregory, and Griscom has accepted the report, audited by Arthur Young and Company, on behalf of the Union.

The Honorary and Life Memberships on September 30, 1940, were as follows: Patrons, 2; Fellows Emeriti, 3; Honorary Fellows, 22; Life Fellows, 9; Life Members, 18; Life Associate members, 84; Honorary Life Associate members, 47. These 185 individuals (and 38 free exchanges) received 'The Auk' for 1940 without payment of annual dues, as is customary. The annual membership in good standing on September 30, 1940, was as follows: Fellows, 39; Members, 114; Associate members, 1321; subscribing Corresponding Fellows, 14; a total of 1488. Also there were 201 paid subscribers. The total circulation of Volume 57 of 'The Auk' was thus 1912.

During the year 821 copies of 'The Auk' were distributed, thirty-eight of which were free copies sent to satisfy claims for non-delivery during the period of October, 1936, through October, 1937. The gross income was \$659.23. 269 copies were purchased at a cost of \$209.38. The net income was \$449.85.

On October 1, 1939, there were 26,283 copies of 'The Auk' in stock. Of the 224 issues, 34 had less than 20 copies each. As a result of the manipulation of the stock through sales and purchases, the average number of copies of the 34 rare issues has risen 1.3 and the average number of copies of issues that are not rare has dropped 3.1; in other words, the stock has been somewhat equalized and the Union now owns more rare copies and fewer common copies, than it did a year ago.

The consolidation of the several Endowment Funds, as ordered by the Council at the Berkeley meeting in June of 1939 and as carried out by the Committee of Trustees, is the most important action of a financial nature that was taken in the past year. In the Trustees' Annual Report for the year ending September 30, 1940, of major

interest is the value (merger value or market value as of September 30, 1939) of the several funds, as follows:

|                             |             |
|-----------------------------|-------------|
| Life Membership Fund.....   | \$13,683.13 |
| William Brewster Fund.....  | 7,866.97    |
| Ruthven Deane Fund.....     | 5,052.50    |
| Memorial Research Fund..... | 1,748.22    |
| Bird Protection Fund.....   | 1,037.41    |
| Educational Fund.....       | 500.00      |
|                             | <hr/>       |
|                             | \$29,618.23 |

During the year the Memorial Research Fund was added to the Life Membership Fund, the name changed to General Endowment Fund and a further addition of \$250.00 as shown in the foregoing Treasurer's Report, was made to it. The value on the basis of which income from all investments will be distributed to the various funds for the coming year was therefore, on September 30, 1940, as follows:

General Endowment Fund—

|                                    |             |
|------------------------------------|-------------|
| Former Life Membership Fund.....   | \$13,683.13 |
| Former Memorial Research Fund..... | 1,748.22    |
| Addition during fiscal year.....   | 250.00      |
|                                    | <hr/>       |
|                                    | \$15,411.35 |
| William Brewster Fund.....         | 7,866.97    |
| Ruthven Deane Fund.....            | 5,052.50    |
| Bird Protection Fund.....          | 1,037.41    |
| Educational Fund.....              | 500.00      |
|                                    | <hr/>       |
|                                    | \$29,868.23 |

The annual appraisal as of September 30, 1940, of all the investments of the Union showed a market value of \$29,721.30. The shrinkage in value of \$146.93, less than half of one per cent, is completely without significance. The average net income yield on the total investments for the 1940 fiscal year was 4.41% as compared with a yield of 4.01% for the previous year. This major increase of income is due principally to the consolidation of the several funds which has permitted a more effective use of capital, while various other factors have been of minor importance.

The gaining of a high rate of income on the investments while maintaining the capital value is a commentary on the zeal and skill with which the Committee of Trustees, Messrs. George H. Stuart, 3d, chairman, Edward Norris, and Charles B. Riker, have managed the endowment funds of the Union, not only during the past year but for many years previously.

RUDYERD BOULTON, *Treasurer and Business Manager*





#### For Sale

Scientific Books and Papers on Natural History subjects. Proceedings, Reports, Journals, Bulletins of Colleges, States, Societies. No item too small.

F. N. BASSETT,

722 N. ORANGE DRIVE, LOS ANGELES, CAL.

## BOOK BINDINGS

OF

*Inspiring Beauty*

Magazines bound in sturdy Buckram.  
FREE — Beautiful engraved Brochure.

Write for particulars.

**Monastery Hill Bindery**

1751 Belmont Ave., Chicago, Ill.

## BOOKS relating to NATURAL HISTORY

Out of print titles . . .

. . . diligently sought for

List issued yearly

### THE BIBLIOPHILE

1836 N. HIGH STREET

COLUMBUS, OHIO

Gene Rea, Mgr.

Associate A. O. U.

#### To members of the A. O. U.:

One of the aims of the Publication Committee is to bring to you, through the medium of this newly established advertising section, information on where to buy the products, facilities and services that you may need to further your particular interest in birds.

#### To advertisers in 'The Auk':

With a background of 57 consecutive years of regular publication, 'The Auk' provides a ready means of reaching a stable reader-public, small in terms of circulation, but large in terms of enthusiastic use of equipment, books and aids to scientific research.

For information relative  
to advertising, rates, and so  
on, address

The Business Manager  
of 'The Auk,'  
Field Museum,  
Chicago, Illinois.

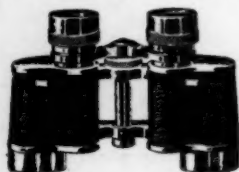
# BINOCULARS

NEW

USED

Optically Guaranteed

ZEISS - HENSOLDT - BAUSCH & LOMB



## USED

|                             |            |         |
|-----------------------------|------------|---------|
| Zeiss ....                  | 8 x 30     | \$65.00 |
| Zeiss ....                  | 6 x 30     | 50.00   |
| Zeiss ....                  | 4 x 20     | 35.00   |
| Zeiss ....                  | 7 x 50     |         |
|                             | (ind. eye) | 90.00   |
| Leitz ...                   | 10 x 50    | 100.00  |
| Leitz ...                   | 8 x 30     | 65.00   |
| Many others. Send for list. |            |         |

## NEW

|                 |        |         |
|-----------------|--------|---------|
| Zeiss ....      | 6 x 30 | \$90.00 |
| Bausch & Lomb . | 7 x 35 | 94.00   |
| Hensoldt        | 8 x 30 | 102.00  |
| Atco ....       | 8 x 26 | 23.50   |
| Atco ....       | 8 x 30 | 27.50   |
| Colmont         | 8 x 30 | 39.50   |
| Colmont         | 8 x 40 | 67.50   |

*Complete line of Feather-weight Zeiss, Bausch and Lomb and Hensoldt glasses.*

*Cases and straps included with above bargains. Binoculars sent on approval to responsible persons.*

**Schoenig & Company, Inc.**

*Opticians - Cameras*

**Binoculars for discriminating bird students**

**8 E. 42 ST., NEW YORK, N. Y.  
Murray Hill 2-6336**

# Pep Up

*your collecting trips with*

# TABASCO

a concentrated pepper seasoning used by master chefs throughout the world for more than 70 years. A few drops on tasteless food works wonders!

FOR AN ACCENT ON  
TASTE ... TRY TABASCO!



**McILHENNY  
COMPANY**  
AVERY ISLAND, LA.

*the audubon water fountain*




... an electrically heated and thermostatically controlled drinking cup for wild birds during the winter.

... a selection of bird feeders tested by nature's laboratory and approved by the birds.

... hummingbirds' floral cups.

*ask for our folders*

**audubon  workshop**

NOT INCORPORATED

**GLENCOE, ILLINOIS**

# THE AUK

A Quarterly Journal of Ornithology

ORGAN OF THE AMERICAN ORNITHOLOGISTS' UNION

Manuscripts should be typewritten if possible. As an aid in bibliography, titles should be brief. References to literature, if few, may be inserted in parentheses at the appropriate places in the text, or listed at the end of the paper rather than in footnotes. Roman numerals and extensive tables are to be avoided. Line drawings intended for text illustrations should be in India ink; half-tones cannot be printed in the text since the paper is unsuitable. Longer articles should have a brief summary at the end. Except on request, no proofs of 'General Notes' or short communications will be submitted to authors.

Twenty-five copies of leading articles are furnished to authors free of charge. Reprints from 'General Notes,' 'Correspondence,' etc., must be ordered from the Editor when the manuscript is submitted.

All articles and communications intended for publication and all books and publications intended for review should be sent to the Editor,

DR. GLOVER M. ALLEN

*Museum of Comparative Zoology  
Cambridge, Mass.*

Information relative to advertising, subscriptions, requests for back numbers of 'The Auk,' as well as for other publications of the Union, changes of address and remittances should be sent to the Treasurer and Business Manager,

RUDYERD BOULTON

*Field Museum of Natural History  
Chicago, Illinois*

---

## OFFICERS OF THE AMERICAN ORNITHOLOGISTS' UNION

*President:* JAMES P. CHAPIN, American Museum of Natural History, New York, New York.

*Vice-Presidents:* JAMES L. PETERS, Museum of Comparative Zoology, Cambridge, Massachusetts.

GEORGE WILLETT, Los Angeles Museum, Los Angeles, California.

*Secretary:* DR. LAWRENCE E. HICKS, Ohio Wildlife Research Station, Ohio State University, Columbus, Ohio.

*Treasurer and Business Manager:* RUDYERD BOULTON, Field Museum of Natural History, Chicago, Illinois.

## *Audubon Wildlife Tours*

LAKE OKEECHOBEE  
KISSIMMEE PRAIRIE

Feb. 3 to March 30,  
1941

In no part of America can you see a richer variety of beautiful and spectacular wild birds than in the Lake Okeechobee and Kissimmee Prairie regions of Central Florida. Great concentrations of Eastern Glossy Ibises . . . Audubon's Caracaras . . . large flocks of Wood and White Ibises . . . American and Snowy Egrets . . . Florida Cranes. . . Here is an exceptional opportunity to see these remarkable birds, and to become familiar with other examples of animal and plant life of this fascinating area, on a conducted Audubon Wildlife Tour.

Audubon Wildlife Tours, initiated in the 1940 season with capacity attendance, represent a new venture in facilitating wildlife observation in sanctuary areas maintained by the National Audubon Society. The tours are under the personal direction of Alexander Sprunt, Jr., Supervisor of Southern Audubon Sanctuaries.

Beginning on February 3, and on every Monday and Thursday during the balance of February and March (except March 31), visitors will be booked for two-day tours. Operations will be based at Okeechobee City, where special hotel accommodations are available. Each group is limited to six persons. The rate of \$10. per person is planned on a non-profit, break even basis, and does not include board or lodging. An illustrated circular will be sent upon request.

**NATIONAL AUDUBON SOCIETY**

1006 Fifth Avenue  
New York, N. Y.